ENSR
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June 12, 2006

Ms. Jo Bentz
Regional Water Quality Control Board
North Coast Region
5550 Skylane Boulevard, Suite A
Santa Rosa, California 95403

RE: Addendum to Support the Work Plan for Additional Subsurface Assessment
Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue, Santa Rosa, California
ENSR Project Number 06940-362-120

Dear Ms. Bentz:

ENSR Corporation (ENSR) has been authorized by Union Oil Company of California (Unocal) to prepare an Addendum to the Work Plan for Additional Subsurface Assessment (**Work Plan**) dated March 9, 2006 for the former Unocal Bulk Plant No. 1975 located at 1051 Spencer Avenue, Santa Rosa, California (**Figure 1**). The purpose of this Addendum will be to support the assessment of:

- the lateral and vertical extent of petroleum hydrocarbons in soil and groundwater in the vicinity of the former aboveground storage tank (AST) pads; and
- the geotechnical characteristics of the subsurface in the vicinity of the proposed remediation wells.

This Addendum has been prepared to address additional comments and recommendations included in correspondence dated May 5, 2006 from the North Coast Regional Water Control Quality Board (RWQCB) **(Attachment A)**.

PROPOSED SCOPE OF WORK

Task 1 – Pre-Field Activities

ENSR has prepared a site-specific Health and Safety Plan (HASP) to address potential physical and chemical hazards associated with work at the site and other health and safety considerations. In addition, a Job Safety Analysis (JSA) will be prepared which will detail mitigation of specifically identified hazards that could be encountered in performance of various tasks within the proposed scope of work. The HASP and JSA will be reviewed and approved by ENSR Health and Safety Management and Unocal prior to commencement of field activities. All work performed by ENSR and subcontractors will be performed in accord and compliance with the HASP and JSA. A copy of the updated HASP is included in **Attachment B**.

All other pre-field activities remain as they were stated in the Work Plan.

Task 2 – Field Activities

Job Set Up

The procedures for the Job Set Up remain as stated in the Work Plan.

Hand Auger Soil Borings

ENSR proposes to advance three hand auger soil borings at the locations shown on **Figure 2**. The proposed total depth of two borings (HA-1 and HA-2) has been changed from 10 feet below ground surface (bgs) in the Work Plan to an approximate depth of 12 bgs. The third boring (HA-3) will be advanced to the first encountered groundwater. Soil samples will be analyzed for total petroleum hydrocarbons as gasoline (TPHg) and total petroleum hydrocarbons as diesel (TPHd) by Environmental Protection Agency (EPA) Method 8015M, volatile organic compounds (VOCs) by EPA Method 8260B, motor oil, oil and grease by EPA Method 413.1, and pesticides by EPA Method 8141. The analyses for TPHd, motor oil and oil and grease will be performed both with and without silica gel cleanup (SGC).

The samples will be thermally preserved in appropriate containers for the specified laboratory analyses. Soil samples submitted for volatile organic analysis will be collected by EPA Method 5035 using 5-gram En Core® samplers. Five En Core® samples and one brass tube, acetate sleeve, or glass jar will be taken per soil sample depth. All samples will be transported under chain-of-custody (COC) protocols to a state-certified laboratory for chemical analysis. The soil borings will be back-filled with hydrated bentonite grout and neat cement from the total depth of the boring to surface grade. The abandoned soil borings will be finished at the surface to match the surrounding surface material. Field methods and procedures are included in **Attachment C**. A sampling plan is included as **Table 1**.

GeoProbe® Soil Boring

The proposed GeoProbe® boring and field procedures remain as stated in the Work Plan.

Soil Stockpile Sampling, Temporary Storage, and Disposal Activities

All methods for Soil Stockpile Sampling, Temporary Storage, and Disposal Activities remain as stated in the Work Plan.

Grab Groundwater Sampling

A grab groundwater sample will be collected at one hand auger boring just below the water table. The groundwater sample will be submitted to a state-certified laboratory under COC protocols for analyses of TPHg and TPHd by EPA Method 8015M, a full VOC scan by EPA Method 8260B, motor oil, oil and grease by EPA Method 413.1, and pesticides by EPA Method 8141. TPHd, motor oil, and oil and grease analyses will be performed both with and without SGC.

All methods for collecting the groundwater sample remain as stated in the Work Plan. An amended sampling plan is included as **Table 1**.

Groundwater Sampling for Natural Attenuation Parameters

All procedures for groundwater sampling for natural attenuation parameters remain as stated in the Work Plan.

Job Ending

All Job Ending procedures remain as stated in the Work Plan.

Reporting

All methods for reporting remain as stated in the Work Plan.

Schedule

ENSR proposes to commence work immediately upon receipt of regulatory approval. The proposed work is estimated to require 45 days following receipt of all required permits and dependant upon subcontractor availability. As requested by the RWQCB, soil sampling will occur during a period of low seasonal groundwater elevations which is anticipated during the next few months.

Remarks/Signatures

The proposals and interpretations contained in this work plan represent our professional opinions, and are based in part, on information supplied by the client. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

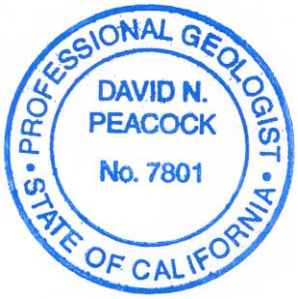
If you have any questions regarding this project, please contact William Glenn at (714) 973-3373.

Sincerely,
ENSR Corporation

Nichole Pagano
Staff Geologist

William S. Glenn, Jr., PG # 7737
Project Manager

D.N. Peacock, Ph.D., P.G. # 7801
Senior Project Manager



NP/jc

Table: 1 - Sampling Plan

Figures: 1 - Site Location Map
2 - Site Plan with Proposed Boring Locations

Attachments:
A - RWQCB Letter dated May 5, 2006
B - Health and Safety Plan
C - Field Methods and Procedures

cc: Mr. John Frary, Union Oil Company of California
Gaddis Nursery
Cooper, Tower, & Murphy

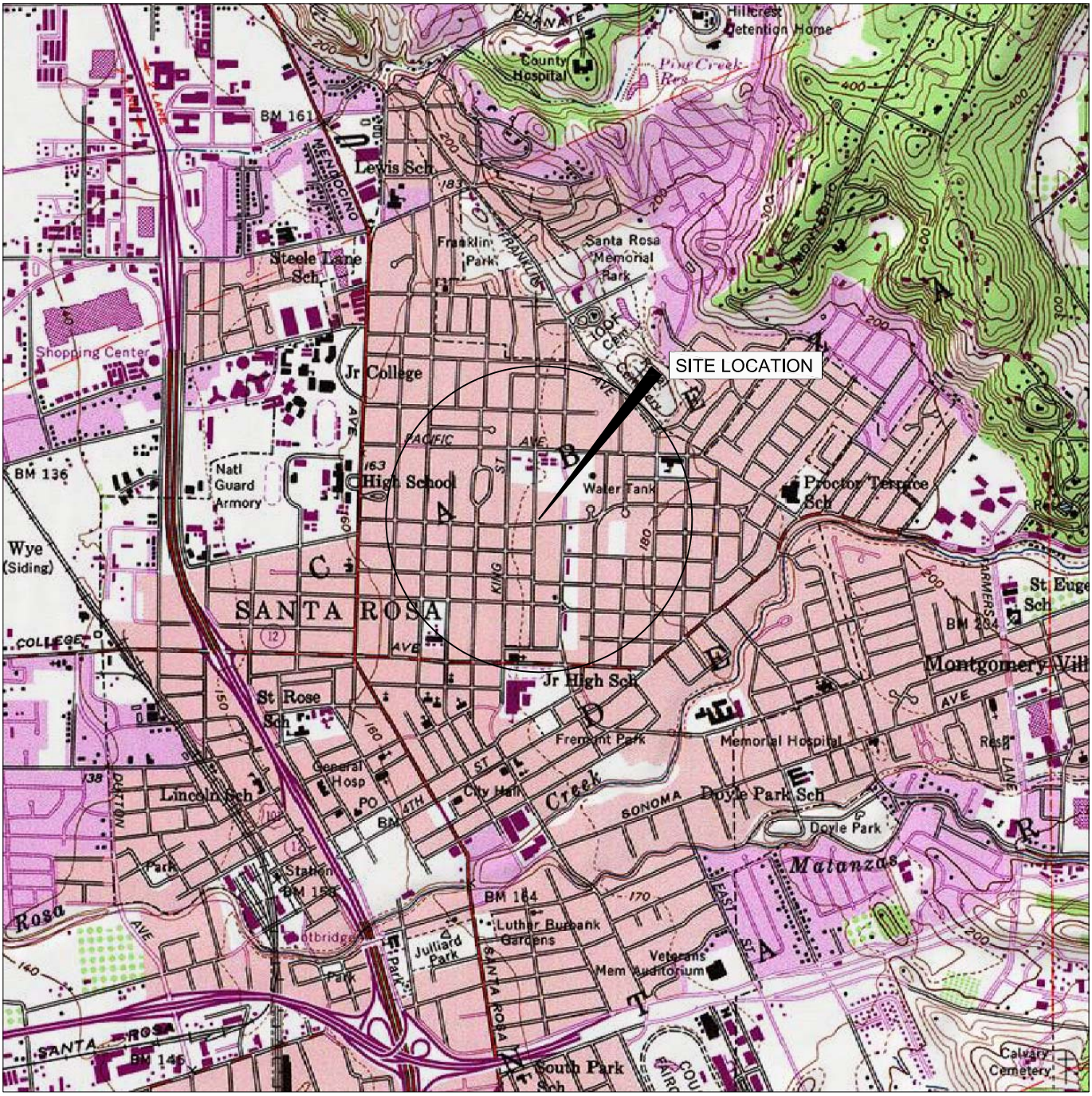
Table

Table 1
Sampling Plan
Former Unocal Bulk Plant No. 1975
1051 Spencer Avenue
Santa Rosa, California

Sample Location	Sample Depth (ft bgs)	Sample Container	Analysis
HA-1	5	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
	10	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
	12	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
HA-2	5	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
	10	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
	12	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
HA-3*	5*	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
	10*	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
	15*	1 6-inch Sleeve, 5 Encore Containers	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141
GP-1**		Shelby tube	Bulk density, porosity, moisture content, particle size distribution, grain density, permeability, vertical conductivity, specific retention, and total organic carbon content
HA-3 GW	Grab sample at gw depth	3 VOAs, 3 1-L Glass	TPHd, TPHg 8015M, VOCs 8260B, Motor Oil and Oil and Grease 413.1, Pesticides 8141

Notes:
* To be sampled every five feet until groundwater is encountered
** Samples to be taken at changes in lithology and moisture content
TPHd = Total petroleum hydrocarbons as diesel
TPHg = Total petroleum hydrocarbons as gasoline
VOAs = volatile organic analysis, 40 milliliter vials with preservative
ft bgs = feet below ground surface

Figures



Map created with TOPO - 2003 National Geographic

MAP LOCATION

SOURCE: BASE MAP FROM USGS SANTA ROSA, CA
7.5 MINUTE TOPOGRAPHIC 1994

N

0 2000

Approximate Scale in Feet

ENSR | AECOM

ENSR CORPORATION
1420 HARBOR BAY PKWY STE 120
ALAMEDA, CALIFORNIA 94502
PHONE: (510) 748-6700
FAX: (510) 748-6799
WEB: HTTP://WWW.ENSR.AECOM.COM

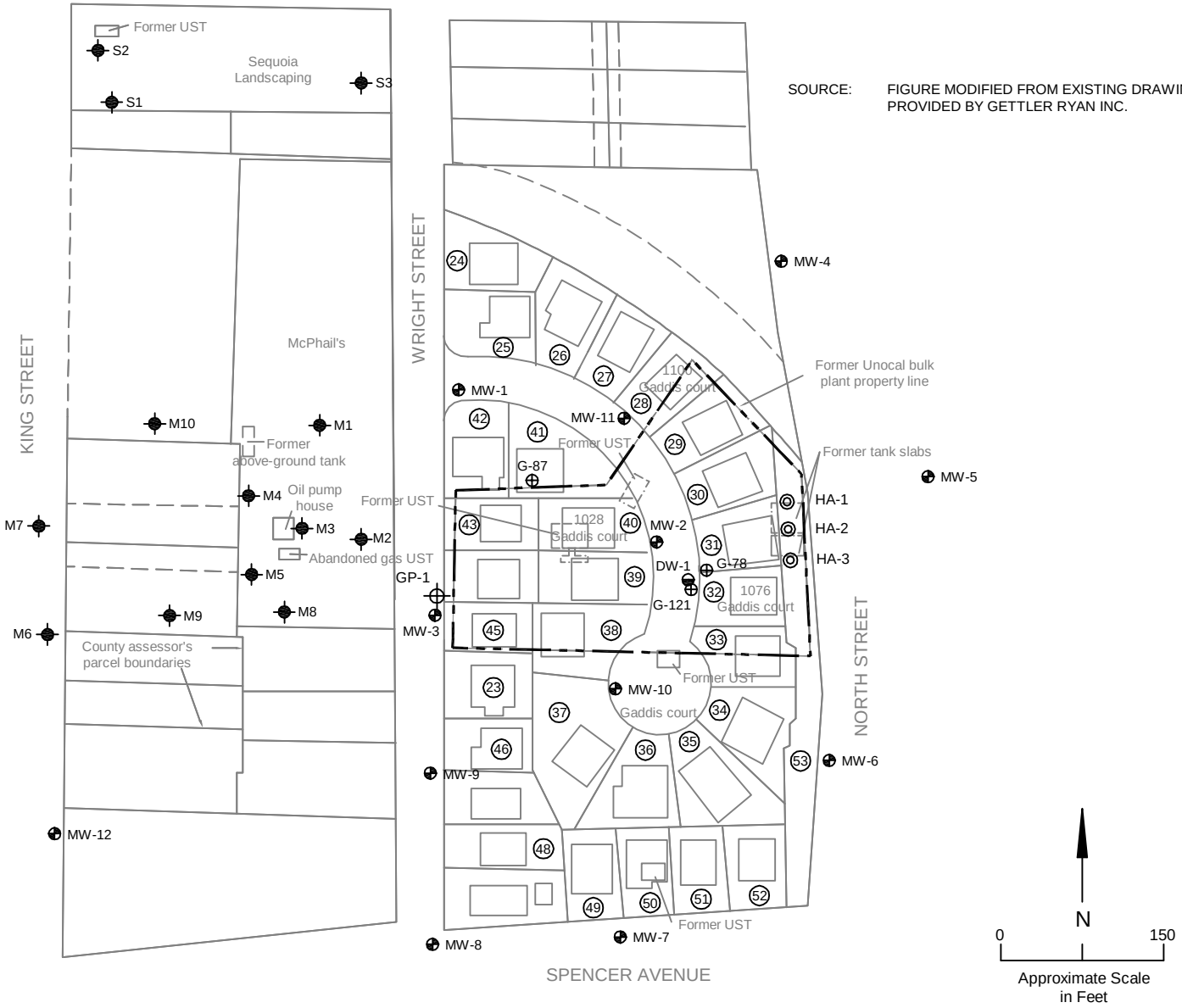
SITE LOCATION MAP

FORMER UNOCAL STATION 1975
1051 SPENCER AVENUE
SANTA ROSA, CALIFORNIA

FIGURE NUMBER: 1

DRAWN BY:	DATE:	PROJECT NUMBER:	SHEET NUMBER:
E. COWAN	04/06/06	06940-362-100	X

1975 SLM 1Q06



SOURCE: FIGURE MODIFIED FROM EXISTING DRAWING PROVIDED BY GETTLER RYAN INC.

LEGEND

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELLS (OFFSITE)
- FORMER GADDIS WELLS
- DEEP MONITORING WELL
- PROPOSED GEOPROBE LOCATION
- PROPOSED HAND AUGER LOCATION
- (49) SONOMA COUNTY, CA ASSESSOR'S PARCEL

ENSR | AECOM

ENSR CORPORATION
10461 OLD PLACERVILLE ROAD SUITE 170
SACRAMENTO, CALIFORNIA 95827
PHONE: (916) 362-7100
FAX: (916) 362-8100
WEB: HTTP://WWW.ENSR.AECOM.COM

SITE PLAN WITH PROPOSED BORING LOCATIONS

FORMER UNOCAL STATION 1975
1051 SPENCER AVENUE
SANTA ROSA, CALIFORNIA

FIGURE NUMBER: 2

DRAWN BY:	DATE:	PROJECT NUMBER:	SHEET NUMBER:
MD	2/6/06 PR	06940-362	1

Attachment A
RWQCB Letter dated May 5, 2006

MAY 12 2006

California Regional Water Quality Control Board
North Coast Region
William R. Massey, Chairman

Dan Skopec
Acting Secretary

www.waterboards.ca.gov/northcoast
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403
Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135

Arnold Schwarzenegger
Governor

May 5, 2006

Mr. John Frary
Union Oil Company of California
P.O.Box 1069
San Luis Obispo, CA 93406

Mr. Bill Gaddis
Gaddis Nursery
3050 Piner Road
Santa Rosa, CA 95405

Cooper, Tower and Murphy
P.O. Box 2740
Santa Rosa, CA 95405

California Homes
P.O. Box 2740
Santa Rosa, CA 95405

Gentlemen:

Subject: Review of Environmental Investigation Submittals

File: Gaddis Nursery, 1051 Spencer Avenue, Santa Rosa, California
Case No.-1TSR133, CAO No. 97-45

The North Coast Regional Water Quality Control Board (Regional Water Board) has comments on the following reports prepared by ENSR Corporation on behalf of Union Oil Company of California:

- *Workplan for Additional Site Assessment* dated March 9, 2006,
- *Request for Extension of Deadline for Remedial Action Plan* dated April 6, 2006, and
- *Semiannual Groundwater Monitoring Results Report, First Half 2006* dated April 21, 2006.

Workplan for Additional Site Assessment-

ENSR proposes to advance two hand auger borings to approximately 10 feet below ground surface (bgs) and one boring to the depth of first encountered groundwater at the former above ground storage tank (AST) slab located on North Street and 1082 Gaddis Court. The workplan proposes collection of one to three soil samples from each of the three hand auger borings at the former AST source area and one grab groundwater sample from one hand auger boring. In addition, the workplan includes advancement of a single Geoprobe® boring on Wright Street for evaluation of geotechnical parameters and analysis of groundwater from select monitoring wells for natural attenuation parameters.

Regional Water Board staff concurs with the number and location of borings proposed in the workplan. However, staff recommends that an addendum be prepared for the AST source area investigation to consider the comments and recommendations below:

1) Soil and groundwater samples need to be analyzed for motor oil, oil and grease, and pesticides, in addition to the analytes given on page 4 and 5 of the workplan.

2) Soil samples analyzed for volatile organic compounds (VOCs) must be collected and preserved using EPA Method 5035. Please see the enclosed Regional Water Board letter dated November 27, 2000 regarding sampling requirements for soil VOC analysis (Enclosure 1).

3) In 1993, total petroleum hydrocarbon (TPH) gasoline and TPH as diesel were detected in soil samples collected from 10.5 to 11.0 bgs at the AST tank slab area. The workplan proposes to advance two hand auger borings to a depth of approximately 10 feet bgs. Based on depths of previously reported soil contamination, staff recommends that all hand auger borings be advanced to a minimum depth of 11 or 12 feet bgs. One soil sample shall be collected from the bottom of each hand auger boring, as well as from the sample depths prescribed on page 4 of the workplan.

4) Depth to shallow groundwater at the Gaddis Nursery site is subject to wide seasonal fluctuations. Due to heavy winter and spring rains in 2006, depth to first encountered groundwater at the Gaddis Nursery site was reported in the First Half 2006 Semiannual Groundwater Monitoring Report as 5 feet or less. To characterize residual soil contamination in the AST source area, staff recommends that soil and groundwater samples be collected during a period of low seasonal groundwater elevations.

5) The workplan proposes the analysis of natural attenuation parameters in groundwater from four site monitoring wells. Future remediation of groundwater at this site may involve the use of nutrient enhancement as well as oxygen diffusion. The use of nutrient addition to groundwater requires compliance with General Waste Discharge Requirements Order No. R1-2004-0021. A copy of Order No. R1-2004-0021 is enclosed for your use (Enclosure 2). Order No. R1-2004-0021 contains permit requirements, including analysis of background water quality parameters and development of a monitoring plan, needed if nutrient enhancement is used for groundwater cleanup at this site.

A workplan addendum for the Additional Subsurface Assessment is due within 45 days of the date of this letter.

Request for Extension of Deadline for Remedial Action Plan (RAP)-

ENSR requested an extension for submittal of the Gaddis Nursery RAP. ENSR's extension request is to allow consideration of the AST source area results in the final remedial action plan. The request for an extension is granted. The new submittal date for the RAP is 60 days after completion of the AST subsurface assessment. A meeting, or teleconference with ENSR and Regional Water Board staff can be scheduled during the 60 day period if warranted.

First Half 2006 Semiannual Groundwater Monitoring Reports-

Regional Water Board staff has reviewed the First Half 2006 Semiannual Groundwater Monitoring Report. Staff notes that onsite monitoring well DW-1 is the only site monitoring well screened in the deeper aquifer from 31 to 41 feet. Analysis of groundwater from DW-1 has not been performed since 2004 when 39 ppb bis (2-ethylhexyl) phthalate and 510 ppb TPH diesel were detected in DW-1. To evaluate if groundwater remediation of the deeper aquifer is needed at this site, staff recommends annual (September) analysis of groundwater from DW-1 beginning September 2006. DW-1 groundwater analyses need to include TPH gasoline, TPH diesel with silica gel cleanup, BTEX, and EPA Method 8270.

If you have any questions or would like to schedule a meeting to discuss the proposed work, please contact me at (707) 576-2838.

Sincerely,

Jo Bentz
Engineering Geologist

050506_jlb_Gaddis Review of wkpln-Ext request.doc

Enclosures:

1) Copy of November 27, 2000 Regional Water Board letter on Use of Method 5035

2) General Waste Discharge Requirements Order No. R1-2004-0021 for In Situ, Bioremediation of Petroleum Hydrocarbons

cc: (Enclosures)
Mr. Will Glenn, ENSR International, Inc., 2850 South Red Hill Ave., Suite 110, Santa Ana, CA 92705
Mr. Kent Baugh, ENSR International, 1420 Harbor Bay Parkway, Suite 120, Alameda, California 94502-7098

(No Enclosures)
Gaddis List
Ms. Karen Randles Office of Environmental Health Hazard Assessment, 1001 I Street, 12th Floor, Sacramento, CA 95814
Sonoma County Environmental Health Department
Mr. Doug Dahme, Santa Rosa Fire Department

California Regional Water Quality Control Board
North Coast Region
William A. Hoy, Chairman

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/~rwqcb1/
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403
Phone 1-877-721-9203 (toll free) • Office (707) 576-2220 • FAX (707) 523-0135

MAY 12 2006

November 27, 2000

To all interested parties,

Dear Interested Parties:

Subject: Soil Sample Collection and Preservation using United States Environmental Protection Agency (EPA) Method 5035 for Volatile Organic Compounds

This memorandum is to present the general requirements of the North Coast Regional Water Quality Control Board (Regional Water Board) for collection, storage, and preservation of soil and other soli matrices for volatile organic compound (VOC) analysis. Traditional sampling methods such as collecting soils in capped metallic sleeves or transferring soils to a glass jar with minimal headspace have been shown to produce inaccurate and inconsistent results due to the losses associated primarily with volatilization and biodegradation prior to analysis.

Therefore, unless otherwise approved by Regional Water Board staff, all workplans submitted to the Regional Water Board on or after December 15, 2000 should follow EPA Method 5035 for VOC sampling in soils, sediment and sludges. EPA Method 5035 should be used for preparing solid matrices for a wide variety of VOC analyses including (but not limited to):

- General types of halogenated and non-halogenated VOCs (e.g. EPA Method 8021/8260 compound
- Purgeable petroleum compounds (e.g. gasoline);
- Aromatics (e.g. benzene, toluene, ethylbenzene, xylenes);
- Fuel additives (e.g. Methyl tertiary Butyl Ether, tertiary Butyl Alcohol).

If you have any questions or comments, please contact Damien O'Bid at (707) 576-2552 or obidd@rb1.swrcb.ca.gov.

Sincerely,

Susan Warner, P. E.
Supervising Water Resources Control Engineer

DEO:dc\EPA Method 5035 letter.doc

cc: Consultant List
Laboratory List

California Regional Water Quality Control Board
North Coast Region

MAY 1 2 2006

ORDER NO. R1-2004-0021
ID No.

GENERAL WASTE DISCHARGE REQUIREMENTS FOR IN SITU, BIOREMEDIATION OF PETROLEUM HYDROCARBONS BY THE ADDITION OF NUTRIENTS, MICROORGANISMS, AND/OR AN OXYGEN SOURCE TO GROUNDWATER AND/OR SOIL

All Counties

The California Regional Water Quality Control Board, North Coast Region (hereinafter the Regional Water Board), finds that:

1. Section 13260(a) of the California Water Code (CWC) requires that all persons discharging waste or proposing to discharge waste that could affect the quality of waters of the state file a report of waste discharge with the Regional Water Board. Under these General Waste Discharge Requirements a Notice of Intent to Comply (NOI) serves as the equivalent of a report of waste discharge.

2. Section 13260(a) also requires that the appropriate filing fee be submitted along with the report of waste discharge. For the purposes of determining the appropriate filing fee, discharges regulated by these General Waste Discharge Requirements are considered to have a threat to water quality rating of 3, and a complexity rating of A, as defined in Section 2200 of the California Water Code. The associated fee must accompany the NOI submitted by a discharger seeking coverage under these General Waste Discharge Requirements.

3. The addition of nutrients (nitrogen, phosphorus, and/or nutrient formula), microorganisms, and/or an oxygen source (magnesium peroxide, calcium peroxide, hydrogen peroxide, and other similar compounds), and air to groundwater and/or soil can be an effective treatment technology capable of enhancing the bioremediation of petroleum hydrocarbons in groundwater, and reducing cleanup times.

4. The injection of nutrients, microorganisms and and/or an oxygen source to groundwater and/or soil is a discharge of waste subject to section 13260 of the California Water Code. However, the discharge of nutrients, microorganisms and/or an oxygen source to soil and groundwater is intended to provide an environmentally beneficial and efficient cleanup, and is anticipated to reduce costs compared to other traditional cleanup remedies such as pump and treat.

5. The Regional Water Board Water Quality Control Plan for the North Coast Region (Basin Plan) includes water quality objectives and receiving water limitations.

carbon dioxide, oxidation-reduction potential, alkalinity, pH, temperature, specific conductivity, total dissolved solids, oxygen reductive potential;

b. Description and schematic of the treatment system, including a schematic of the area of application;

c. Complete definition of all preferential pathways and buried utilities;

d. Description and volume of any chemical additives;

e. Results of a preliminary study to evaluate the effectiveness and feasibility of the in situ soil and groundwater bioremediation. The preliminary study should include geologic and hydraulic aspects of the site such as soil stratification and hydraulic conductivity;

f. Description of expected breakdown products and potential impacts;

g. Description and quantities of specific microrganisms to be used; and

h. Description and quantities of nutrients to be used.

2. The discharger shall submit a monitoring plan to monitor the effectiveness of the treatment system and groundwater quality. The monitoring plan shall describe the locations to be sampled and will include the following: (1) an up-gradient sampling point; (2) a down-gradient sampling point and; (3) sampling points within the contaminated zone. The monitoring plan shall also address the constituents in the table of sampling parameters found in **Attachment A** to this Order.

3. The discharger shall submit a sensitive receptor study that includes identification of all sensitive receptors within 1500 feet and all beneficial uses of groundwater for the specific site.

4. The discharger shall publish a notice of proposed discharge of constituents in accordance with these General Waste Discharge Requirements in a newspaper of general circulation in the affected area, post a copy of the notice at the site in a prominent location(s), and shall provide notice to contiguous property owners and any interested parties.

B. NOTIFICATION OF COVERAGE

Project coverage under these General Waste Discharge Requirements shall not take effect until the Executive Officer notifies the Discharger in writing that coverage has been issued. The Executive Office shall not issue notification project coverage under the General Waste Discharge Requirements prior to providing notice and a 30-day public comment period on the proposed issuance of coverage. Notification of project coverage under these General Waste Discharge Requirements shall not be issued if the Executive Officer finds that there may be significant impacts to water quality, or finds that significant public controversy has arisen or will likely arise

the succeeding owner or operator of the following items by letter, in advance of the transfer of ownership or control, a copy of the notice must be forwarded to the Regional Water Board:

a. existence of this Order; and

b. the status of the dischargers' annual fee account

6. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under Federal, State, or Local laws, nor create a vested right for the discharger to continue the waste discharge.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151 and the Monitoring and Reporting Program developed for the specific discharge as described in condition of ELEGIBILITY REQUIREMENT A.2 above, and any modifications to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services.

8. Signatory Requirements

a. All reports, NOI, or other documents required by these General WDRs, and other information requested by the Regional Board shall be signed by a person described below or by a duly authorized representative of that person.

i. for a corporation: by a responsible corporate officer such as: (a) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function; (b) any other person who performs similar policy or decision making functions for the corporation; or

ii. the manager of one or more manufacturing, production, or operating facilities if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b. Reports required by this Order, other information requested by the Regional Water Board, and NOI's may be signed by a duly authorized representative provided:

b. accidents caused by human error or negligence; or

c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate the steps taken to correct the problem and the dates thereof, and the steps being taken to prevent the problem from recurring.

11. Revision of Requirements

The Regional Water Board may review this Order periodically and may revise requirements when necessary. In addition, the discharger shall file a report of waste discharge with the Executive Officer at least 120 days before making any material change or proposed change in the character, location, or volume of the discharge.

12. Termination of Coverage

Project coverage under these General Waste Discharge Requirements may be terminated, by the Executive Officer at any time upon giving reasonable notice to the discharger.

Certification

I, Catherine E. Kuhlman, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on May 12, 2004.

Catherine E. Kuhlman
Executive Officer

(WDRS Nutrients & Microbes)

ATTACHMENT A

Table of parameters to be addressed in the monitoring plan:

Constituent	Frequency	Duration
Nutrient Concentrations	Daily	During injection
Nutrient Concentrations	Quarterly	Until attainment of background conditions
Nitrate	Quarterly	Until attainment of background conditions
Nitrite	Quarterly	Until attainment of background conditions
Sulfate	Quarterly	Until attainment of background conditions
Sulfide	Quarterly	Until attainment of background conditions
Ferric Iron	Quarterly	Until attainment of background conditions
Ferrous Iron	Quarterly	Until attainment of background conditions
Total Nitrogen	Quarterly	Until attainment of background conditions
Total Phosphorous	Quarterly	Until attainment of background conditions
pH	Quarterly	Until attainment of background conditions
Site specific contaminants	Quarterly	Until attainment of background conditions
Total dissolved solids	Quarterly	Until attainment of background conditions
Chemical oxygen demand	Quarterly	Until attainment of background conditions
Dissolved O_2	Quarterly	Until attainment of background conditions
Dissolved CO_2	Quarterly	Until attainment of background conditions
Temperature	Quarterly	Until aquifer returns to background conditions
Oxygen reduction potential	Quarterly	Until aquifer returns to background conditions

Attachment B
Health and Safety Plan

Health and Safety Plan

Environmental Investigation, Oxygen Diffusion, and Groundwater Sampling Activities Performed at the former Unocal Petroleum Distribution Facility at 1051 Spencer Ave Santa Rosa, CA

June 2006

Revised by: Nichole Pagano Date: June 6, 2006
Health and Safety Coordinator

Approved by: Joseph E Sanders Date: June 6, 2006
Regional Director of Health and Safety

Approved by: Date: June 6, 2006
Project Manager

CONTENTS

1. INTRODUCTION

1.1. Purpose

This Health and Safety Plan (HASP) has been developed by ENSR Corporation (ENSR) to minimize potential risk to personnel involved with environmental investigation, oxygen diffusion (Waterloo Emitter installation), and ongoing groundwater monitoring activities being conducted at the former Unocal Petroleum Distribution Facility located at 1051 Spencer Avenue in Santa Rosa, California.

The provisions of this HASP apply to ENSR personnel and subcontractor personnel who will be potentially exposed to safety and/or health hazards associated with the tasks outlined in Section 3.0 of this HASP. This HASP has been written to comply with OSHA's Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120), and the CalOSHA equivalent. All activities covered by this HASP must be conducted in complete compliance with all applicable federal, state, and local health and safety regulations. Personnel covered by this HASP who cannot or will not comply with these requirements will be excluded from site activities.

1.2. Loss Prevention System©

ENSR has adopted and is implementing the Loss Prevention System© (LPS) on this site. Among other requirements, LPS includes development of Job Safety Analyses for each major task, performing Safe Performance Self-Assessments (SPSAs), and Loss Prevention Observations (LPOs). Site workers must be trained in LPS and implement it on this site.

1.3. Chevron Tenets of Operational Excellence (OE)

1. Always operate within design or environmental limits.
2. Always operate in a safe and controlled condition.
3. Always ensure safety devices are in place and functioning.
4. Always follow safe work practices and procedures.
5. Always meet or exceed customers' requirements
6. Always maintain integrity of dedicated systems.
7. Always comply with all applicable rules and regulations.
8. Always address abnormal conditions
9. Always follow written procedures for high-risk or unusual situations.
10. Always involve the right people in decisions that affect procedures and equipment.

1.4. Modifications

Every effort has been made to address the hazards associated with the contaminants and activities that will be encountered at this site. Unanticipated site-specific conditions or situations may occur during the implementation of the proposed site remediation that are not addressed in this document. As such, this HASP must be considered a working document that is subject to change to meet the needs of each site remediation.

If unique site hazards are present or different remediation tasks are proposed that have not been addressed in this HASP, it will be necessary to modify this HASP. All proposed modifications to this HASP must be reviewed and approved by the RHSM before such modifications are implemented in the field. Modifications to the HASP will be incorporated into the document as addenda.

1.5. Approval and Dissemination

All ENSR personnel and subcontractor personnel covered by this HASP must read a copy of it and return the HASP signoff sheet (Attachment A) to the ENSR Site Safety Officer (SSO) prior to the start of on-site activities.

1.6. Responsibilities

The implementation of health and safety at this project location will be the shared responsibility of the ENSR Project Manager (PM), the ENSR Regional Health and Safety Manager (RHSM), the ENSR Project Site Safety Officer (SSO) and all other ENSR and contractor personnel.

1.6.1. Project Manager

The ENSR PM, William Glenn, is responsible for ensuring that the requirements of this HASP are implemented at that project location. Some of the PM's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have received a copy of it.
- Providing the RHSM with updated information regarding environmental conditions at the site and the scope of site work.
- Providing adequate authority and resources to the on-site SSO to allow for the successful implementation of all necessary safety procedures.
- Supporting the decisions made by the SSO and RHSM.
- Maintaining regular communications with the SSO and, if necessary, the RHSM.
- Coordinating the activities of all subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project.
- Providing project scheduling and planning activities.

1.6.2. Regional Health and Safety Manager

The ENSR RHSM (Joe Sanders) is the individual responsible for the preparation, interpretation and modification of this HASP. Modifications to this HASP which may result in less stringent precautions cannot be undertaken by the PM or the SSO without the approval of the RHSM. Specific duties of the RHSM include:

- Writing, approving and amending the HASP for this project;
- Advising the PM and SSOs on matters relating to health and safety;
- Recommending appropriate personal protective equipment (PPE) and air monitoring instrumentation; and
- Maintaining regular contact with the PM and SSO to evaluate the conditions at the property and new information which might require modifications to the HASP.

1.6.3. Site Safety Officer

All ENSR field technicians are responsible for implementing the safety requirements specified in this HASP. Nichole Pagano will serve as the site safety officer (SSO). The SSO will be appointed by the PM. The SSO will be on-site during all activities covered by this HASP. The SSO is responsible for enforcing the requirements of this HASP once work begins. The SSO has the authority, and the responsibility, to immediately correct all situations where noncompliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies have submitted a completed copy of the HASP sign-off form;
- Assuring that all personnel to whom this HASP applies have attended a pre-entry briefing prior to entering a restricted area;
- Maintaining a high level of health and safety consciousness among employees at the work site;
- Procuring and distributing the PPE needed for this project for ENSR employees;
- Procuring the air monitoring instrumentation required and performing air monitoring for ENSR activities;
- Verifying that all PPE and health and safety equipment is in good working order;
- Setting up and maintaining the cleanup zone within the restricted areas and assuring proper cleanup of all site personnel;
- Notifying the PM of all noncompliance situations and stopping work in the event that an immediate danger situation is perceived;

- Monitoring and controlling the safety performance of all personnel within the established restricted areas to ensure that required safety and health procedures are being followed and correcting any deficiencies;
- Conducting accident/incident investigations and preparing accident/incident investigation reports;
- Conducting the pre-entry briefing as required by Section 9.3 of the HASP; and,
- Initiating emergency response in accordance with Section 10.0 of this HASP.

1.6.4. Field Personnel

All ENSR and contractor field personnel are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading the HASP in its entirety prior to the start of on-site work;
- Submitting a completed HASP Acceptance Form and documentation of medical surveillance and training to the SSO prior to the start of work;
- Attending the pre-entry briefing prior to beginning on-site work;
- Bringing forth any questions or concerns regarding the content of the HASP to the PM or the SSO prior to the start of work;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the ENSR SSO; and,
- Complying with the requirements of this HASP and the requests of the SSO.

1.6.5. Subcontractors

Additionally, subcontractors are responsible for:

- Designating a SSO to work in conjunction with ENSR's SSO;
- Complying with the requirements of this HASP and the directions of the SSO;
- Ensuring, via daily inspections, that their equipment is in good working order;
- Immediately reporting to ENSR, any accidents, injuries, or near misses;
- Operating their equipment in a safe manner;
- Providing ENSR with copies of material safety data sheets (MSDS) for all hazardous materials brought on site; and,
- Providing all the required PPE for their employees.

2. SITE DESCRIPTION / HISTORY

2.1. Site Description

The site was formerly the location of a Unocal bulk petroleum distribution plant. Residential property is currently on the former site with commercial property to the North and other residential property surrounding the remaining property.

2.2. Site History

- Unocal operated a bulk gasoline and diesel plant on the northern part of the property while Gaddis Nurseries operated on the southern part of the property.
- Unocal installed USTs on site in 1956 and removed them in 1976 while at the same time the property was combined under single ownership of Gaddis Nurseries.
- In 1987, three existing USTs were removed and contaminated soil was discovered near former Unocal USTs.
- Site ownership was transferred to Cooper, Towery, and Murphy and then to California Homes for residential development that exists today.

3. SCOPE OF WORK

Previously, ENSR performed the following task at this site:

- Groundwater monitoring from existing wells

At this time, activities will involve:

- Soil boring and well installation, via auger drilling;
- Soil sampling;
- Installation of Waterloo Emitters (In-situ Oxygen diffusers); and
- Semi annual sampling of existing groundwater monitoring wells

The Waterloo Emitter consists of an oxygen diffuser membrane and it works by supplying the equipment with pure oxygen. The oxygen diffuses through the membrane, without bubble generation, to the groundwater, causing a very high dissolved oxygen (DO) level in the water. The apparatus is about the size of a groundwater pump, connected to the small O_2 cylinder via tubing. The entire assembly fits inside of the 4-inch diameter well. The only hazard would be handling the compressed O_2 cylinder.

4. CHEMICAL HAZARDS

The following types of chemicals may be present as contaminants of concern during the proposed activities at this site.

- Gasoline associated with the presence of former on-site USTs.

4.1. Gasoline

Gasoline is a highly complex mixture of more than 150 aliphatic and aromatic hydrocarbons including small amounts of benzene, toluene, xylene, and sometimes either tetraethyl lead or methyl tertiary butyl ether. The actual composition varies with the source of the crude petroleum, the manufacturer, and the time of year.

Gasoline is a colorless, pale brown, or pink liquid. Gasoline is very flammable; it catches on fire quite easily, evaporates quickly, and forms explosive mixtures with air. Most people can begin to smell gasoline at 0.25 parts of gasoline per million parts of air (ppm). Gasoline may be present in the air, groundwater, and soil. Gasoline does not dissolve readily in water. However, some of the chemicals that make up gasoline can dissolve easily in water.

Exposure to the vapors of gasoline above its exposure limit may produce irritation of the mucous membranes of the upper respiratory tract, nose, and mouth. Overexposure may also result in the depression of the central nervous system. Symptoms of such exposure include drowsiness, headache, fatigue, and drunken-like behaviors. Another common effect is irritation of the skin and mucous membranes of the upper respiratory tract. Repeated or prolonged skin contact may result in dermatitis due to defatting of the skin.

The American Conference of Governmental Industrial Hygienists (ACGIH) has recommended a threshold limit value (TLV) of 300 ppm for gasoline as an 8-hour time weighted average (TWA).

Tetraethyl and tetramethyl lead were used as anti-knock ingredients in gasoline. There is a potential at some of the Unocal sites with older releases, for these alkyl-lead compounds to be present. Due to its relatively low volatility (VP = 0.2 mm), exposure to tetraethyl lead is not likely to occur by the vapor route during this work, rather as a contaminant of airborne dust. The inhalation of tetraethyl lead contaminated dusts may result in irritation of the respiratory tract. This dust, when in contact with moist skin or eye membranes, may cause itching, burning, and transient redness. The direct absorption of a sufficient quantity of tetraethyl lead, whether briefly at a high rate, or for prolonged periods at a low rate, may cause acute intoxication of the central nervous system. Mild degrees of intoxication may cause headache, anxiety, insomnia, nervous excitation, and minor gastrointestinal disturbances. The OSHA PEL for both compounds is 0.075 mg/m^3, as an 8-hr TWA.

Methyl tertiary butyl ether (MTBE) is an additive used to increase the octane ratings of gasoline. Direct contact with the liquid may cause minor skin and eye irritation. Prolonged or repeated inhalation of MTBE vapor may cause irritation of the respiratory tract as well as depression of the central nervous system. OSHA has not established a PEL for MTBE. However, the ACGIH recommends a TLV of 50 ppm, as an 8-hr TWA.

4.2. Fuel Oils (Diesel, etc.)

Fuel oils are generally considered to be of moderate to low toxicity. Federal or recommended airborne exposure limits have not been established for the vapors of fuel oils. However, inhalation of low concentrations of the vapor of either may cause mucous membrane irritation. Inhalation of high concentrations of the vapors may cause extensive pulmonary edema. Chronic direct skin contact with the liquids may produce skin irritation as a result of defatting. Repeated skin contact may also cause irritation of the hair follicles and block the sebaceous glands. This produces a rash of acne pimples and spots, usually on the arms and legs.

4.2.1. Hazardous Properties of Potential Chemical Contaminants

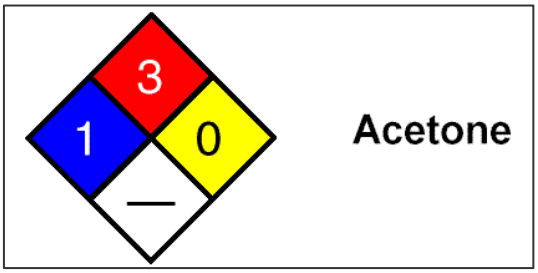
Chemical Name	PEL[1]	TLV[2]	VP[3]	VD[4]	SG[5]	SOL[6]	FP[7]	LEL[8]	UEL[9]
Gasoline	NE	300	>400	3	0.8	Neg.	<-40	1.4	7.6
Benzene	1	0.5	75	2.8	0.88	0.07	12	1.2	7.8
Toluene	200	50	21	3.1	0.87	0.07	40	1.1	7.1
Ethylbenzene	100	100	7	3.7	0.87	0.01	55	0.8	6.7
Xylene	100	100	7	3.7	0.88	0.02	90	0.9	6.7
Tetraethyl lead	0.075 mg/m^3	0.1 mg/m^3	0.2	8.6	1.6	Neg.	200	1.8	?
MTBE	NE	50	245	3.0	0.74	2	-15	1.5	?
Diesel Fuel Oil	NE	NE	0.5	>2	0.85	Neg.	>52	0.6	7.0

1 Permissible Exposure Limit in ppm
2 Threshold Limit Value in ppm
3 Vapor Pressure in mm Hg
4 Vapor Density (air = 1)
5 Specific Gravity (water = 1)
6 Solubility in Water in %
7 Flash Point in °F
8 Lower Explosive Limit in % by volume
9 Upper Explosive Limit in % by volume
NE = Not Established
NA = Not Applicable
? = Not known

4.3. Hazardous Substances Brought On-Site by ENSR or Subcontractor

A material safety data sheet (MSDS) must be available for each hazardous substance that ENSR or subcontractor brings onto the property. This includes solutions/chemicals that will be used to decontaminate sampling equipment, field test kits, calibration gases or dye solutions. As a minimum, the MSDSs for isobutylene calibration gas (for the PID) and ozone are provided in Attachment D. Other MSDSs should be attached as required. See Attachment F for a letter regarding Liquinox as a replacement cleaner for Alconox.

In addition, all containers of hazardous materials must be labeled in accordance with OSHA's Hazard Communication Standard. Either the original manufacturer's label or an NFPA 704M label specific for the material (as shown at the right) is considered to be an acceptable label.



4.4. Hazard Potential / Control

4.4.1. Hazard Potential

The potential hazards, based on the proposed activities include:

- Dermal contact with potentially contaminated soils during soil boring and sampling activities;
- Inhalation of dusts during soil boring activities;
- Dermal contact with contaminated groundwater during installation and sampling of groundwater monitoring wells.
- Inhalation of petroleum hydrocarbon vapors during subsurface investigative activities;
- Potential reactions via oxygen and hydrocarbons during operation of the O2 Emitter system; and
- Physical hazards, as described in Section 5, below.

4.4.2. Hazard Control

Hazards can be identified and controlled in several ways.

- To reduce the potential for contact with contaminated soils, sediment, and groundwater, as well as separate phase product, personal protective equipment (PPE), as described in Section 7.1 of this HASP, will be worn.

- As a precautionary measure, the breathing zone of employees will also be screened with the PID during activities involving potential exposure to contaminated soil or groundwater. If sustained VOC concentrations exceed the established action level, as defined in Section 6.1, respiratory protection, as indicated in Section 7.2, will be donned.
- And finally, care will be exercised in handling the O_2 bottle, to avoid leaks and potential reactions with organic materials; and
- Precautions will be taken, per Section 5, against the physical hazards involved.

5. OPERATIONAL HAZARDS

5.1. Driving Safety

Drivers must be licensed to drive the class of vehicle they are operating and trained in defensive driving. Only ENSR personnel may drive ENSR vehicles or vehicles rented for ENSR business; client, subcontractor, or other work-related personnel may ride. Drivers and passengers must comply with all traffic laws and posted signs, and will not operate a vehicle if under the influence of impairing medication, alcohol, or any other substance.

5.1.1. Planning / Preparation

- Prior to departure, check traffic reports, weather conditions, road construction, and road closures. If necessary, develop an alternate route and new, approved JMP (Journey Management Plan).
- Prior to entering the vehicle, inspect the vehicle (see Appendix, *Safe Driving*).
- Leave early to allow for contingencies.
- See Section 5, *Traffic Hazards*, regarding the need for a Traffic Control Plan.

5.1.2. DOT

If you are to operate a vehicle exceeding 10,000 pounds (or vehicle and trailer with a combined weight over 10,000 pounds), or you are to transport hazardous materials, you MUST comply with DOT regulations. These are NOT addressed in this HASP; contact the H&S Department if this applies.

5.1.3. Distractions

You must NOT operate a vehicle while talking on your cell phone, regardless of “hands free” or not. If you receive a call, pull over to answer it. Do NOT allow other distractions to interfere with your safe operation of the vehicle.

5.1.4. Secure Packing

Do not move your vehicle unless all equipment and supplies are secured. Items and material which may roll, slide, or move about in your vehicle while traveling are a major hazard. Secure the load!

*(See the **Safe Driving Appendix** for additional information.)*

5.2. Utility Hazards

5.2.1. Underground Utilities

California requires a utility clearance to be performed prior to initiation of any subsurface work. Table 1 summarizes the utility clearance requirements for CA.

TABLE I
UTILITY CLEARANCE REQUIREMENTS

State	Notification Time	Contact
CA North	2 Working Days	Underground Service Alert North (800) 227-2600 http://www.usanorth.org/

ENSR will contact USA North to request a mark-out of natural gas, electric, telephone, cable television, water and sewer lines in the proposed boring or excavation locations. Work will not begin until the required utility clearances have been performed.

Public utility clearance organizations such as USA North typically do not mark-out underground utility lines that are located on private property. As such, ENSR must exercise due diligence and try to identify the location of any additional private utilities that ma exist on this site. ENSR can fulfill this requirement in several ways, including:

- Obtaining as-built drawings for the areas being investigated from the property owner;
- Visually reviewing each excavation location with the property owner or knowledgeable site representative;
- Performing a geophysical survey to locate utilities or hiring a private line locating firm to determine the location of utility lines that are present at the property;
- Identifying a no-dig zone (by positively identifying known utilities); or
- Hand digging or air-knifing to 8’ in the proposed excavation locations if insufficient data is available to accurately determine the location of the utility lines.

5.2.2. Overhead Utilities

Be particularly aware of overhead power lines in the work area. Any vehicle or mechanical equipment capable of having parts of its structure elevated (drill rig, crane, etc.) near energized overhead lines shall be operated so that a clearance of at least 10 feet is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 inches for every 10kV over that voltage. Personnel should also be aware of the limited clearances associated with the canopy that typically covers the dispensing island.

5.3. Hazards from Chipping Asphalt and Concrete

An increased eye hazard exists during the cutting or chipping of asphalt and/or concrete surfaces to facilitate drilling activities. Employees must wear safety glasses with attached sideshields to protect them from flying debris. Employees may also choose to wear a faceshield over their glasses if impact from the debris is excessive. This activity also poses potential respiratory (dust) and noise hazards, requiring a respirator and hearing protection.

5.4. Air Knifing / Vacuum Excavation

Air-knifing / vacuum excavation will be used to "clear" boring locations prior to actual Geoprobe boring. This operation will be used to locate potential utilities (and cobble) down to 8', and to avoid drilling through utilities with the drill rig. Air-knifing / vacuum excavation produces a lot of noise and requires the use of hearing protection. Airborne dust and projectiles are also potential hazards during this process, though the vacuum should collect small dust particles. Goggles or a face shield should be worn to protect against dust and projectiles, and a respirator may be necessary if excessive dust (normally controlled) is created and not captured.

5.5. Drilling Hazards

5.5.1. Conventional Drilling

Use of a drill rig to advance soil borings and install monitoring wells will require all personnel in the vicinity of the operating rig to wear steel-toed boots, hardhats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities. Additionally, the following safety requirements must be adhered to:

- All drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and geologists must be aware of the location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller and helper shall not simultaneously handle augers unless there is a standby person to activate the emergency stop.
- The driller must never leave the controls while the tools are rotating unless all personnel are kept clear of rotating equipment.

- A long-handled shovel or equivalent must be used to clear drill cuttings away from the hole and from rotating tools. Hands and/or feet are not to be used for this purpose.
- A remote sampling device must be used to sample drill cuttings if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. If personnel must work near any tools which could rotate, the driller must shut down the rig prior to initiating such work.
- Drillers, helpers, and geologists must secure all loose clothing when in the vicinity of drilling operations.
- Only equipment which has been approved by the manufacturer may be used in conjunction with site equipment and specifically to attach sections of drilling tools together. Pins that protrude excessively from augers shall not be allowed
- No person shall climb the drill mast while tools are rotating.
- No person shall climb the drill mast without the use of ANSI-approved fall protection (approved belts, lanyards and a fall protection slide rail) or portable ladder which meets the requirements of OSHA standards.

5.5.2. Geoprobe™ Hazards

Use of the Geoprobe system to collect soil and groundwater samples will require all personnel in the vicinity of the operating unit to wear steel-toed boots, hardhats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities.

Additionally, the following safety requirements must be adhered to:

- A remote vehicle ignition is located on the control panel of the Geoprobe unit. This allows the operator to start and stop the vehicle engine from the rear. This device must be tested prior to job initiation and periodically thereafter. All employees should be aware of how to access and operate the rear ignition.
- The driller must never leave the controls while the probe is being driven.
- Drillers, helpers, and geologists must secure all loose clothing when in the vicinity of drilling operations.
- The Geoprobe vehicle shall not be moved any distance with the probe in the extended position. Check for clearance at roof or the vehicle before folding the Geoprobe out of the carrier vehicle.
- Be sure the parking brake is set before probing.
- Never allow the derrick foot to be lifted more than 6 inches off of the ground surface.

- Deactivate hydraulics when adding or removing probe rods, anvils or any tool in the hammer.
- Verify that all threaded parts are completely threaded together before probing.

5.5.3. Hand Augering

Hand augering, though not presenting the potential hazards of automated drilling, does pose potential ergonomic hazards (strains and sprains). Persons performing hand augering should stretch their muscles out before hand and take breaks during the work to avoid muscle strains or tendonitis. Leather of substantial work gloves should be worn to prevent blisters. Extreme cares should be exercised in manipulating the auger flights to avoid energized wires overhead or elsewhere. Auger shafts should be removed as they come out of the hole to avoid potentially fatal contact with power lines.

5.6. Cuts and Lacerations

Geoprobe soil samples are contained within an acetate liner that must be cut open in order to retrieve the sample. As such, employees are at an increased risk of cutting themselves since a knife or blade is typically used to open the liner and the liner is often placed on an irregular or unstable work surface (i.e., the back of the Geoprobe van or the ground). When using knives or blades, follow the safety precautions listed below:

- Keep your free hand out of the way
- Secure the acetate liner so it won't roll or move while your cutting
- Use only sharp blades; dull blades require more force which results in less knife control
- Pull the knife toward you; pulling motions are easier to manage
- Don't put your knife in your pocket
- Use a hooked knife (i.e. linoleum knife) or a utility knife with a self-retracting blade
- Wear leather or Kevlar™ gloves when using knives or blades.

5.7. Traffic Hazards

The site is currently used for mixed residential and commercial purposes and therefore vehicle traffic may be a concern. If so, the following precautions should be implemented:

- Notify the property owner of your work location, dates of work and the anticipated work times. Suggest the possibility of a detour around the work area.
- Wear a Type II safety vest. If work is being performed at dawn or evening the vests must have additional reflective tape (Type III vest).

- Set up traffic cones (or barriers are more protective) 50 feet in front of the work area. "Men at Work" signs should also be placed in a conspicuous area to warn others of your presence.

If site activities occur along or in Spencer Avenue or any other ROW, the ENSR field team leader or PM must contact the local authorities to determine if a Traffic Control Plan (TCP) or police detail is required. Regardless of municipal or county requirements, ENSR will develop and implement a TCP of project work exposes site workers or the public to traffic hazards. (If required, the TCP will be attached to this HASP)

5.8. Noise

Use of a drill rig or other heavy machinery may expose employees to excessive amounts of noise. Exposure to noise can result in the following:

- Temporary hearing losses where normal hearing returns after a rest period.
- Interference with speech communication and the perception of auditory signals.
- Interference with the performance of complicated tasks.
- Permanent hearing loss due to repeated exposure resulting in nerve destruction in the hearing organ.

Since personal noise monitoring will not be conducted during the proposed activities, employees must follow this general rule of thumb:

If the noise levels are so loud that you must shout at someone who is 5 feet away from you, you need to be wearing hearing protection. ENSR employees can wear either disposable earplugs or earmuffs but all hearing protection must have a minimum noise reduction rating (NRR) of 27 db.

5.9. Electrical Hazards

If using portable electrical tools or if electrical power is used, follow the safety precautions listed below:

- Check to see that electrical outlets used to supply power during field operations is of the three wire grounding type.
- Extension cords used for field operations should be of the three wire grounding type and designed for hard or extra-hard usage. This type of cord uses insulated wires within an inner insulated sleeve and will be marked S, ST, STO, SJ, SJO, or SJTO.
- NEVER remove the ground plug blade to accommodate ungrounded outlets.

- Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings, or floors.

- Protect the cord from becoming damaged if the cord is run through doorways, windows or across pinch points.

- Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades MUST BE REMOVED from service immediately.

- All portable or temporary wiring which is used outdoors or in other potentially wet or damp locations must be connected to a circuit which is protected by a ground fault circuit interrupter (GFCI). GFCI's are available as permanently installed outlets, as plug-in adapters and as extension cord outlet boxes. DO NOT CONTINUE TO USE A PIECE OF EQUIPMENT OR EXTENSION CORD WHICH CAUSES A GFCI TO TRIP.

- When working in potentially flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class I, Division I atmospheres.

- Do not touch a victim who is still in contact with current. Separate the victim from the source using a dry, nonmetallic item such as a broomstick or cardboard box. Be sure your hands are dry and you are standing on a dry surface. Turn off the main electrical power switch and then begin rescue efforts.

5.10. Back Safety

Using the proper techniques to lift and move heavy pieces of equipment is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects:

- Use mechanical devices to move objects that are too heavy to be moved manually.

- If mechanical devices are not available, ask another person to assist you.

- Bend at the knees, not the waist. Let your legs do the lifting.

- Do not twist while lifting.

- Bring the load as close to you as possible before lifting.

- Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip and fall hazards

5.11. Heat Stress

Types of Heat Stress

Heat related problems include **heat rash, fainting, heat cramps, heat exhaustion and heat stroke**. **Heat rash** can occur when sweat isn't allowed to evaporate, leaving the skin wet most of the time and making it subject to irritation. **Fainting** may occur when blood pools to lower parts of the body and as a result, does not return to the heart to be pumped to the brain. Heat related fainting often occurs during activities which require standing erect and immobile in the heat for long periods of time. **Heat cramps** are painful spasms of the muscles due to excessive salt loss associated with profuse sweating. **Heat exhaustion** results from the loss of large amounts of fluid and excessive loss of salt from profuse sweating. The skin will be clammy and moist and the affected individual may exhibit giddiness, nausea, and headache. **Heat stroke** occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red, and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling. Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

Early Symptoms of Heat-Related Health Problems:

- Decline in task performance
- Incoordination
- decline in alertness
- unsteady walk
- Reduced vigilance
- excessive fatigue
- muscle cramps
- dizziness

Susceptibility to Heat Stress Increases due to:

- lack of physical fitness
- lack of acclimation
- increased age
- dehydration
- obesity
- drug or alcohol use
- sunburn
- infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The Effect of Personal Protective Equipment

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, the wearing of certain personal protective equipment (PPE), particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can therefore become significantly impaired by the wearing of PPE.

Measures to Avoid Heat Stress:

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternative job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK. For an 8-hour work day, 50 ounces of fluids should be drunk.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak heat hours such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
- Avoid double shifts and/or overtime.

The implementation and enforcement of the above mentioned measures will be the joint responsibility of the project manager, on-site field coordinator, and health and safety officer. Potable water and fruit juices should be made available each day for the field team.

Heat Stress Monitoring Techniques

Site personnel should regularly monitor their heart rate as an indicator of heat strain by the following method:

- Check radial pulse rates by using fore-and middle fingers and applying light pressure to the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beat/minute, shorten the next work cycle by one-third, and keep the rest period the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, shorten the work cycle again by one-third.

5.12. Poisonous Plants / Insects

When working at sites that are heavily vegetated or located near wetlands, employees should be aware of the possible presence of poisonous plants and insects.

Poison oak occurs primarily in the southeast and western United States. The poison oak of the southeastern United States, Rhus quercifolia, has its leaves divided into three leaflets; the leaflets are densely haired and generally have three to seven distinct lobes. The white, berry-like fruits are also somewhat hairy. The poison oak of the U.S. Pacific coast, R. diversiloba, is a shrubby or sometimes climbing plant that grows to 2.4 m (8 ft) high; its three-leaflet leaves are toothed or lobed and are hairless.

The leaves, roots, stems, and fruit of poison oak contain an oil called urushiol. Contact with the irritating oil causes an intensely itching skin rash and characteristic blister-like lesions. The oil can be transmitted on soot particles when burned and may be carried on the fur of animals, equipment, and apparel.

Proper identification of these plants is the key to preventing contact and subsequent dermatitis. Wear long sleeves and pants when working in wooded areas. In areas of known infestation, wear Tyvek coveralls and gloves. Oils are easily transferred from one surface to another. Wash all contaminated clothing and equipment promptly.

If you come in contact with these poisonous plants, wash all exposed areas immediately with cool water to remove the oils. Some commercial products such as Tecnu's Poison Oak-n-Ivy Cleanser claim to further help with the removal of oils.

Ticks are bloodsuckers, attaching themselves to warm-blooded vertebrates to feed. Deer ticks are the most common carriers of Lyme disease, a bacterial infection that is transmitted to humans through the bite of the tick.

Personnel should carefully inspect themselves each day for the presence of ticks or any rashes. This is important since prompt removal of the tick can prevent disease transmission. Female deer ticks are about one-quarter inch in length and are black and brick red in color. Males are smaller and all black.

Removal of the tick is important in that the tick should not be crushed and care must be taken so that the head is also removed. If the head is not completely removed or if the tick is allowed to remain for days feeding on human blood, a condition known as **tick paralysis** can develop, which is due to a neurotoxin that the tick apparently injects while engorging. This neurotoxin acts upon the spinal cord causing incoordination, weakness and paralysis.

One characteristic symptom of Lyme Disease is a bulls-eye rash that develops around the bite site. The rash appears in about 60-80% of all Lyme disease cases. Contact your RHSM immediately if you develop such a rash.

Tick season lasts from April through October; peak season is May through July. Wear light-colored clothing (easier to spot ticks) with long sleeves and make sure that shirts are tucked into pants and pants are tucked into socks or boots. Ticks have a tendency to crawl upwards. These procedures will make it more difficult for a tick to reach your skin.

Studies have determined that repellants containing DEET as a main ingredient are most effective against mosquitoes and ticks. DEET can be directly applied to the exposed skin of adults and/or clothing. Permanone® is another repellent, however; it can only be directly applied to clothing.

5.13. Personal Security

This site is located in an urban environment that may pose a higher potential for personal security concerns. To help ensure the security of employees performing activities at this site, the following precautions should be observed.

- If possible, avoid working alone on this site. On most sites, client, subcontractor, or public personnel are generally nearby in case of an emergency or accident. ENSR personnel, through coordination, can rely upon these personnel for assistance in an emergency.

- If work must be performed alone at this site, follow these basic guidelines:

    - Schedule on-site work during daylight hours whenever possible, and when neighboring commercial establishments are open
    - Keep a mobile telephone with you on site
    - Maintain regular contact with someone in your home office
    - If suspicious persons are present on-site when you arrive, do not leave your vehicle and enter the site until they have departed or have been otherwise identified as not being of concern.
    - Contact police and request that they meet you at the site in the event that suspicious persons remain a concern.
    - Keep your vehicle parked nearby, preferably on the site itself, as opposed to the adjacent side streets.
    - If after leaving the site, you feel that you are being followed in your car, drive directly to a nearby police station. If one is not nearby, drive to the nearest well lit commercial establishment, preferably one that is open and fairly busy (e.g., service station, supermarket, convenience store, etc.). Honk your vehicle's horn if necessary to attract attention.

Arrange for security or the local police to provide protection if the area is subsequently identified as a high-risk crime area.

6. AIR MONITORING

6.1. Direct Reading Instrumentation

Instrument I: Photoionization detector (PID)

A PID, such as a RaeSystems MiniRae 2000 ™ equipped with a 10.6 eV lamp and calibrated to isobutylene, will be used to screen the breathing zone of employees during activities that may expose employees to contaminated soil or groundwater or vapors from the SVE system. If breathing zone concentrations are sustained (15 minutes) at 50 units above background, Level C respiratory protection, as described in Section 7.2, will be donned.

This 50 unit Action Limit is based on the following:

- The current TLV for gasoline is 300 ppm. The most toxic component of gasoline is benzene, whose current TLV is 0.5 ppm. Studies done by McDermott and Killiany in 1978 (Quest for a Gasoline TLV – AIHAJ 39:110-117, 1978) indicate that the benzene content of gasoline vapor is typically in the range of 0.4%. To assure that employee exposures to benzene remain below the current TLV of 0.5 ppm, ENSR has established an Action Limit of 50 ppm total VOCs (i.e., approximately 0.5 ppm/0.4%) for gasoline contaminated sites. Based upon RaeSystems response data for gasoline on an isobutylene calibrated instrument (i.e., 1.0), this equates to an instrument reading of 50 units.

Instrument II: Combustible Gas Monitor (CGI, or LEL Meter)

If high levels of contamination (plume, etc.) are associated with the site, or if high PID readings are encountered, a CGI must be used to quantify the reading for explosive gases or vapors. The action level for stopping work is 10% LEL.

Instrument III: Drager Detector Tube Kit Equipped with Ozone Tubes (Tube # 67-33181)

If eye or respiratory tract irritation is noted while working in the vicinity of the C-Sparge equipment, particularly if it maintained in an indoor location, it may be necessary to conduct air monitoring for ozone to assure that exposures are maintained below safe levels. The referenced tubes are capable of measuring ozone concentrations that range from 0.005-0.7 ppm. Since air purifying respirators do not provide protection against ozone, if sustained (i.e., > 15 minute) breathing concentrations are found to exceed the TLV of 0.1 ppm, employees should leave the area and arrange for temporary ventilation (e.g., portable fans or blowers) to effectively reduce ozone concentrations below the TLV.

6.2. Personal Exposure Monitoring

Personal exposure monitoring will not be conducted.

6.3. Calibration and Recordkeeping

The PID will be calibrated on a daily basis in accordance with ENSR's Standard Operating Procedure and manufacturer's instructions. All PID readings will be recorded in the field notebook or on dedicated air monitoring result sheets. In addition, all calibrations must be recorded. The carbon monoxide meter will be calibrated by the manufacturer or rental agency prior to its being used at the site.

7. PERSONAL PROTECTIVE EQUIPMENT

7.1. Protective Clothing

To prevent direct dermal contact with potentially contaminated soil and/or groundwater, the following protective clothing requirements will be followed:

PPE Item	On site	Drilling	O^2 Diffuser Install.	Sampling, soil, water
Hard hat	✓	✓	✓	✓
Safety glasses	✓	✓	✓	✓
Faceshield				
Steel-toed boots	✓	✓	✓	✓
Gloves, Inner PVC				✓
Gloves, Outer Nitrile			✓	✓
Gloves, Kevlar / Leather		✓		
Hearing Protection		✓	✓	
Traffic Vest – If in active traffic area	✓	✓	✓	✓
Tyvek coveralls				
Polycoated Tyvek coveralls				
Lockout/tagout			✓	

7.2. Respiratory Protection

Air monitoring will be performed to verify that exposure to total VOCs are not exceeding the established action limits as described below.

Task	Action Limit	Respiratory Protection
All tasks involving potential exposure to contaminated soils and/or groundwater and vapors from the SVE system.	50 units above background on the PID for sustained 15-minute period.	Half mask air purifying respirator with combination organic vapor/HEPA cartridges

Respiratory protection should also be donned if:

- Odors become objectionable at any time or
- Respiratory tract irritation is noticed.

All employees who are expected to wear respiratory protection must have successfully passed a quantitative or qualitative fit-test within the past year.

7.3. Other Safety Equipment

The following additional safety equipment will be brought to the site:

- Portable eye wash
- First Aid Kit

8. SITE CONTROL

To prevent both exposure to unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas along with personal protective equipment requirements will be clearly defined.

8.1. Designation of Zones

- Exclusion or "hot" Zone
- Contamination Reduction Zone (CRZ)
- Support Zone

8.2. Exclusion Zone

This site consists of both residential and commercial property and therefore is open and accessible to the public. A restricted zone will be established around those work areas where groundwater monitoring, installation of groundwater monitoring or extraction wells, or installation and O&M of remediation systems is occurring. The purpose of this restricted zone is to warn the public of the potential chemical and physical hazards associated with the environmental activities being performed or supervised by ENSR. If space permits, a 20-foot radius restricted zone will be established around the work area. The restricted zone should be outlined with traffic cones or "Caution Tape" to prohibit entry by the general public.

8.3. Contamination Reduction Zone

Contamination reduction facilities will be established immediately adjacent to any area in which workers may be exposed to contaminated soil or groundwater. This is where personnel will begin the sequential decontamination process (see Section 9.0) when exiting the exclusion zone. To prevent cross contamination and for accountability purposes, all personnel will enter and leave the exclusion zone through the contamination reduction zone.

8.4. Support Zone

The support zone will consist of those areas around the exclusion zone where equipment is staged. Eating, drinking and smoking will be limited to this area.

8.5. General Safety Measures/Precautions

The following measures are designed to augment the specific health and safety guidelines provided in this plan.

- Avoidance of contamination is of the utmost importance. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials.

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in the immediate work area and the decontamination zone.
- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activities.
- Beards or other facial hair that interfere with respirator fit are prohibited.
- The use of alcohol or illicit drugs is prohibited during the conduct of field operations.
- All equipment must be decontaminated or properly discarded before leaving the site in accordance with the project work plan.
- Safety equipment described in Section 6.0 will be required for all field personnel unless otherwise approved by the RHSM.

9. DECONTAMINATION

Proper decontamination is required of all personnel before leaving the site. The extent of personnel decontamination will depend on the amount of contamination encountered. Personnel decontamination will be accomplished by following a systematic procedure of cleaning (when necessary) and removing personal protective clothing (PPE). If necessary, contaminated PPE such as boots will be rinsed free of gross contamination, scrubbed clean in a detergent solution and then rinsed clean. To facilitate this, it may be necessary to establish a three-basin wash system on site.

Disposable PPE, such as gloves, will be disposed of in accordance with the work plan and the client's requirements.

Regardless of the type of decontamination system required, if washing facilities are unavailable, a container of potable water and liquid soap must be made available so employees can wash their hands and face before leaving the site for lunch or for the day.

10. MEDICAL / TRAINING REQUIREMENTS

10.1. Medical Surveillance

All personnel performing activities covered by this HASP must be active participants in a medical monitoring program which complies with 29 CFR 1910.120 (f). Each individual must have completed an annual surveillance examination and/or an initial baseline examination within the last year prior to performing any work on this site covered by this HASP.

10.1.1. Drug and Alcohol Testing

All employees performing filedwork covered by this HASP must comply with Unocal's requirements for drug and alcohol testing requirements.

10.2. Training

All personnel performing activities covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120 (e). Each individual must have completed an annual 8-hour refresher training course and/or initial 40-hour training course within the last year prior to performing any work on this site covered by this HASP.

In addition, each project location must have at least one staff member present on site at all times who is currently trained in First Aid and CPR (Cardio Pulmonary Resuscitation).

10.3. Site Safety Meetings

Prior to the commencement of investigative activities at this site, a site safety meeting will be conducted by the SSO to review the specific requirements of this HASP. Attendance at this pre-entry briefing is mandatory and will be documented (see Attachment B). Short safety refresher meetings will be conducted at least every 10 days thereafter, or as otherwise needed, throughout the duration of the project.

11. AUDITS AND INSPECTIONS

Safety audits must be conducted and documented for each Unocal project location on a monthly basis. In order to meet this requirement, typically these inspections will have to be conducted by the ENSR field team leader and/or project manager.

For short duration jobs (i.e., one week or less), the safety inspection should be conducted shortly after the work has commenced. For longer duration jobs, the inspection should be conducted shortly after commencement and monthly thereafter.

Audits should be documented on the ENSR PM Audit Checklist. To reduce the overall length of this HASP, a copy of the audit checklist is embedded below. Access the checklist by clicking on the icon below. ENSR PMs should print out a copy of the checklist before leaving for the job site, unless a computer and printer will be available at the site.

"Audit Inspection Checklist.xls"

12. INCIDENT RESPONSE

12.1. Emergencies

According to ENSR policy, ENSR personnel shall not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). ENSR response actions will be limited to evacuation and medical/first aid as described within this section below. As such, this section of the HASP has been written to comply with 29 CFR 1910.38 (a).

The basic elements of an emergency evacuation plan include employee training, alarm systems, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures and methods to account for all employees after evacuation.

Employee Training: Employees must be instructed in the specific aspects of emergency evacuation applicable to the site as part of the pre-entry briefing prior to the commencement of all on-site activities. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

Alarm Systems/Emergency Signals: An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be **direct verbal communications**.

Due to the relatively small size of this site, direct communications will be sufficient to warn all employees of a site-related emergency. Although most of the facilities are occupied, some of the facilities are abandoned. ENSR should bring cellular phones to every unoccupied facility with them to summons emergency responders, if necessary.

Escape Routes and Procedures: The escape route from the work location will be verified by the SSO upon arrival to the site. The route will be reviewed with all employees during the pre-entry briefing.

Critical Operations and Equipment: All equipment and operations are required to cease in the event of site evacuation. The only exception will be related to health and safety. The PM or SSO must determine at the time of an emergency if health and safety will be jeopardized by immediate stoppage of any particular piece of equipment or personal activities. If such a determination is made, personnel involved in critical duties must be minimized and special instructions must be established.

Rescue and Medical Duty Assignments: Prior to initiating work at the site, an ENSR field team member, usually the SSO, shall be appointed to activate emergency response actions. In the event an injury or illness requires more than first aid treatment, that individual will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the on-site project manager and the RHSM.

Designation of Responsible Parties: The SSO is responsible for initiating emergency response. In the event the SSO cannot fulfill this duty, the alternate SSO will take charge. All personnel onsite are responsible for knowing the escape route from the site.

Employee Accounting Method: The on-site project manager or SSO is responsible for identifying all ENSR and subcontractor personnel on-site at all times. On small, short duration jobs this can be done informally as long as accurate accounting, via a head-count, is possible.

12.2. Incident Reporting/Investigation

12.2.1. ENSR Requirements

All work-related injuries and illnesses, regardless of severity, must be reported to the ENSR field team leader and/or project manager immediately. The field team leader and/or project manager must report the incident to the ENSR RHSM as soon as possible. Utilize the RHSMs voice mail or e-mail if the incident occurs after hours.

In addition, all near miss incidents must be reported to the ENSR RHSM as soon as possible.

An ENSR Supervisor's Accident Investigation Report form (Attachment C) must be completed by the ENSR field team leader and/or project manager in accordance with the instructions provided by the RHSM and submitted to the RHSM within 24 hours of occurrence of the incident.

If a subcontractor is injured, he/she should report to their supervisor immediately, who in turn, must report the injury to the ENSR SSO.

12.2.2. Unocal Requirements

All significant near misses and serious incidents (e.g., fatalities, lost workday cases, significant property damage) must be immediately reported to one of the Unocal Representative listed on the following page.

In addition, all vehicle accidents that occur on Unocal property must be investigated and a copy of the accident investigation must be submitted to one of the Unocal Representatives within 24 hours of occurrence.

EMERGENCY REFERENCES

	Phone Number and/or Address as appropriate
Ambulance Service:	911
Police:	911
Fire:	911
Local Hospital:	Santa Rosa Memorial Hospital 1165 Montgomery Dr, Santa Rosa, CA 95405-4801 707-546-3210
Directions to Hospital:	See map on following page
Other Important Numbers:	
Nearest Onsite Phone:	Not known – determine upon arrival.

UNOCAL REPRESENTATIVES

San Luis Obispo, CA

- Rick Horn (Ops. Mgr.) 805-547-5479
- John Frary (PM) 805-547-5468

ENSR REPRESENTATIVES:

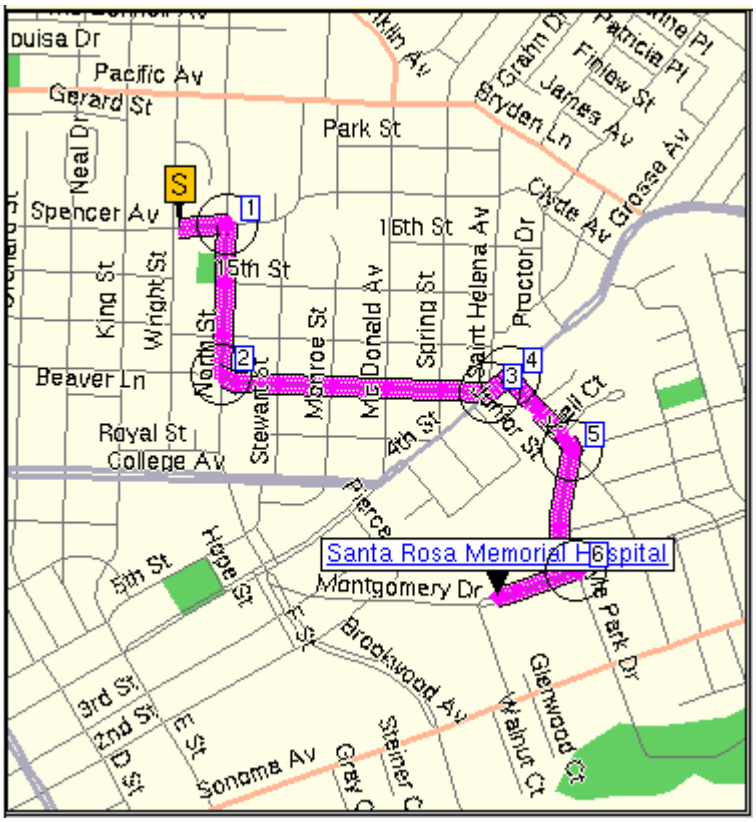
ENSR – Camarillo, CA 805-388-3775

- Mark Flickinger (PM)

ENSR-Ft Collins, CO 970-970-8878

- Joe Sanders (RHSM)x 109 / or (home: 970-225-9627)

Hospital Location Map
Former Unocal Service Station Site at
1051 Spencer Avenue
Santa Rosa, CA



	Directions	Total Miles
Start	Head EAST on SPENCER AV, From **Start Point (1051 Spencer Ave, Santa Rosa, CA)**	0.0
1	Go less than .1 miles and then TURN RIGHT onto NORTH ST	0.1
2	Go **0.2** miles and then TURN LEFT onto 13TH ST	0.3
3	Go **0.4** miles and then BEAR LEFT onto 4TH ST	0.7
4	Go less than .1 miles and then TURN RIGHT onto TALBOT AV	0.7
5	Go **0.1** miles and then BEAR RIGHT onto DOYLE PARK DR	0.8
6	Go **0.2** miles and then TURN RIGHT onto MONTGOMERY DR	1.0
End	Go **0.1** miles to **Santa Rosa Memorial Hospital**, 707-546-3210, 1165 Montgomery Dr, Santa Rosa, CA 95405-4801	1.1

Attachment A
Health and Safety Plan Signoff Sheet

Health and Safety Plan Signoff Sheet

Environmental Investigation, Oxygen Diffusion, and Ongoing Groundwater Sampling Activities Performed at the former Unocal Petroleum Distribution Facility at 1051 Spencer Ave Santa Rosa, CA

I have received a copy of the Health and Safety Plan prepared for the above referenced site, I have read and understand its content and I agree that I will abide by its requirements.

Name	Signature	Company	Date

Attachment B
Pre-Entry Briefing Attendance Sheet

ENSR HEALTH AND SAFETY PLAN PRE-ENTRY BRIEFING ATTENDANCE FORM

Environmental Investigation, Oxygen Diffusion, and
Ongoing Groundwater Monitoring Activities
Performed at the former Unocal Petroleum Distribution Facility at
1051 Spencer Ave
Santa Rosa, CA

Conducted by:		**Date Performed:**	
Topics Discussed:	1. Review of the content of the HASP (Required)		
	2.		
	3.		
	4.		

Attendees (Printed):	Signature	Representing

Attachment C
Supervisor's Accident Investigation Report

ATTACHMENT 8.1
Supervisor's Accident Investigation Report

Injured Employee _____ Job Title _____

Home Office _____ Division/Department_____

Date/Time of Accident _____

Location of Accident _____

Witnesses to the Accident _____

Injury Incurred? _____ Nature of Injury _____

_____

Engaged in What Task When Injured? _____

_____

Will Lost Time Occur? _____ How Long? _____ Date Lost Time Began _____

Were Other Persons Involved/Injured? _____

How Did the Accident Occur? _____

_____

_____

Why Did it Occur?_____

_____

_____

What Could Be Done to Prevent Recurrence of the Accident? _____

_____

_____

What Actions Have You Taken Thus Far to Prevent Recurrence? _____

_____

_____

Supervisor's Name _____ Signature: _____ Date: _____

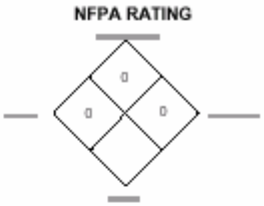
Note: if the space provided on this form is insufficient, provide additional information on separate paper and attach. The completed accident investigation report must be submitted to the ENSR Regional Health and Safety Manager within three days of the occurrence of the accident.

Attachment D
Material Safety Data Sheets

Airgas

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards



PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS:	**NON-FLAMMABLE GAS MIXTURE**
	Document Number: 002103
PRODUCT USE:	For general analytical/synthetic chemical uses.
SUPPLIER/MANUFACTURER'S NAME:	AIRGAS INC.
ADDRESS:	259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283
BUSINESS PHONE:	1-610-687-5253
EMERGENCY PHONE:	1-800-949-7937 International: 1-423-479-0293
DATE OF PREPARATION:	April 22, 2001

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA		NIOSH	OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	ppm
Isobutylene	115-11-7	1 ppm - 1.7%	There are no specific exposure limits for Isobutylene. Isobutylene is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Air	25635-88-5	Balance	There are no specific exposure limits applicable to Air.					
Air is a mixture of gases. The primary components of air, and the approximate concentration of each component, are listed below.								
Nitrogen	7727-37-9	79%	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Oxygen	7782-44-7	21%	There are no specific exposure limits for Oxygen.					

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a colorless, odorless, non-flammable gas. The main health hazards associated with releases of this gas are related to the high pressure within the cylinder. Air, the main component of this product, is generally considered non-flammable, however, Air will support combustion. The flammable component of this gas mixture is below the LEL. A cylinder rupture hazard exists when this product, which is under pressure, is subjected to heat or flames. Emergency responders must wear personal protective equipment appropriate for the situation to which they are responding.

3. HAZARD IDENTIFICATION (Continued)

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for air is by inhalation at elevated or reduced pressure.

INHALATION: This product is non-toxic. Air, the main component of this product, is necessary for life.

OTHER POTENTIAL HEALTH EFFECTS: Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. Over-exposure to this product may cause the following health effects:

ACUTE: The most significant hazards associated with compressed air is the pressure hazard. Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

CHRONIC: There are currently no known adverse health effects associated with chronic exposure to this gas.

TARGET ORGANS: ACUTE: Respiratory system under ambient low pressure conditions. Central nervous system under ambient high pressure conditions. CHRONIC: None expected.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH	(BLUE)	0
FLAMMABILITY	(RED)	0
REACTIVITY	(YELLOW)	0
PROTECTIVE EQUIPMENT		B

EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8

For routine industrial applications

See Section 16 for Definition of Ratings

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus equipment should be worn.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s). Remove victim(s) to fresh air, as quickly as possible. In case of eye contact which leads to irritation, immediately flush eyes with copious amounts of water for at least 15 minutes. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Only trained personnel should administer supplemental oxygen.

In case of frostbite, place the frostbitten part in warm water. DO NOT USE HOT WATER. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions, as well as disorders involving the "Target Organs", as listed in Section 3 (Hazard Information), may be aggravated by overexposure to the components of this product.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen as soon as possible, following exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.
AUTOIGNITION TEMPERATURE: Not applicable.
FLAMMABLE LIMITS (in air by volume, %):
Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

5. FIRE-FIGHTING MEASURES (Continued)

FIRE EXTINGUISHING MATERIALS: Non-flammable gas. Use extinguishing media appropriate for surrounding fire.

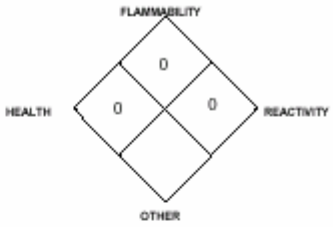
UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this material may decompose and produce toxic gases including carbon monoxide and carbon dioxide. Additionally, when involved in fire, the cylinders may rupture.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural fire-fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move fire-exposed cylinders from area, if it can be done without risk to fire-fighters. Withdraw immediately in case of rising sounds from venting pressure relief devices or any discoloration of tanks or cylinders due to a fire.

NFPA RATING



See Section 16 for Definition of Ratings

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area, protect people, and respond with trained personnel. Minimum Personal Protective Equipment should be **Level D: safety glasses, and mechanically-resistant gloves. Level B, which includes the use of Self-Contained Breathing Apparatus, should be worn when oxygen levels are below 19.5% or are unknown.** Locate and seal the source of the leaking gas. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in place or remove it to a safe area and allow the gas to be released there.

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Do not eat or drink while handling chemicals.

STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable or combustible materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks. Do not allow area where cylinders are stored to exceed 52°C (125°F). Isolate from incompatible materials including flammable materials (see Section 10, Stability and Reactivity), which can burn violently. Use only storage containers and equipment (pipes, valves, fittings to relieve pressure, etc.) designed for the storage of Air. Do not store containers where they can come into contact with moisture. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Never tamper with pressure relief devices in valves and cylinders. The following rules are applicable to situations in which cylinders are being used:

Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap in-place until cylinder is ready for use.

During Use: Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

After Use: Close main cylinder valve. Replace valve protection cap. Mark empty cylinders "EMPTY".

NOTE: Use only DOT or ASME code containers. Earth-ground and bond all lines and equipment associated with this product. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases in Containers*. Additionally, refer to CGA Bulletin SB-2 "*Oxygen Deficient Atmospheres*".

7. HANDLING and STORAGE (Continued)

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Purge gas handling equipment with inert gas (i.e. nitrogen) before attempting repairs. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation.

RESPIRATORY PROTECTION: Maintain Oxygen levels above 19.5% in the workplace. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Splash goggles, face-shields or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or Canadian Standards.

HAND PROTECTION: Wear mechanically-resistant gloves when handling cylinders of this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for **Air**, the main component of this product , unless otherwise stated:

RELATIVE VAPOR DENSITY: 1
SPECIFIC GRAVITY: Not applicable.
SOLUBILITY IN WATER: 1.49% (v/v)
VAPOR PRESSURE, mmHg @ 20°C: Gas, ambient.
EXPANSION RATIO: Not applicable.
SPECIFIC VOLUME: 13.3 ft^3/lb; (0.833 m^3/kg)
EVAPORATION RATE (nBuAc = 1): Not applicable.
FREEZING POINT: -216.2°C (-357.2°F)
BOILING POINT @ 1 atmos: -194.3°C(-317.8°F)
pH: Not applicable.
VAPOR PRESSURE: Not applicable.
ODOR THRESHOLD: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is pertinent to this gas mixture:

APPEARANCE, ODOR AND COLOR: This product is a colorless, odorless gas.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no distinctive properties to this product. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Normally stable.

DECOMPOSITION PRODUCTS: None known.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Air (the main component of this product) is not compatible with fuels, in that air will support combustion. The Isobutylene component of this mixture is incompatible with Strong oxidizers (e.g., chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride).

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials and exposure to heat, sparks and other sources of ignition. Cylinders exposed to high temperatures or direct flame can rupture or burst.

PART III *How can I prevent hazardous situations from occurring?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are for the components of this gas mixture present at a level greater than 1 mole %:

ISOBUTYLENE:
LC_{Lo} (Inhalation-Rat) 620 gm/m^3/4 hours

ISOBUTYLENE (continued):
LC_{Lo} (Inhalation-Mouse) 415 gm/m^3/2 hours

SUSPECTED CANCER AGENT: No component of this gas mixture is found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC, and therefore is not considered to be, nor suspected to be, cancer-causing agents by these agencies.

11. TOXICOLOGICAL INFORMATION (Continued)

IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can cause frostbite and damage to exposed skin and eyes.

SENSITIZATION OF PRODUCT: No component of this product is a skin or respiratory sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not reported to cause mutagenic effects in humans.
Embryotoxicity: This product is not reported to cause embryotoxic effects in humans.
Teratogenicity: This product is not reported to cause teratogenic effects in humans.
Reproductive Toxicity: This product is not reported to cause adverse reproductive effects in humans.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Biological Exposure Indices (BEIs) have been determined for the components of this product are as follows:

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This gas will be dissipated rapidly in well-ventilated areas.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence of an adverse effect of this product on aquatic life is currently available.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Product removed from cylinder must be disposed of in accordance with appropriate U.S. Federal, State and local regulations or with regulations of Canada and its Provinces. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME:	Compressed gases, n.o.s. (Air, Isobutylene)
HAZARD CLASS NUMBER and DESCRIPTION:	2.2 (Compressed Gas)
UN IDENTIFICATION NUMBER:	UN 1956
PACKING GROUP:	Not Applicable
DOT LABEL(S) REQUIRED:	Compressed Gas

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas mixture is considered as dangerous goods, per regulations of Transport Canada. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this material. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

NON-FLAMMABLE GAS MIXTURE (002103) MSDS
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15. REGULATORY INFORMATION (Continued)

ADDITIONAL U.S. REGULATIONS (continued):

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: None.
California - Permissible Exposure Limits for Chemical Contaminants: None.
Florida - Substance List: Isobutylene.
Illinois - Toxic Substance List: None.
Kansas - Section 302/313 List: None.
Minnesota - List of Hazardous Substances: Isobutylene.
Massachusetts - Substance List: None.
Missouri - Employer Information/Toxic Substance List: None.
New Jersey - Right to Know Hazardous Substance List: Isobutylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: None.
Pennsylvania - Hazardous Substance List: Isobutylene.
Rhode Island - Hazardous Substance List: None.
Texas - Hazardous Substance List: None.
West Virginia - Hazardous Substance List: None.
Wisconsin - Toxic and Hazardous Substances: None.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the California Proposition 65 Lists.

LABELING: **CAUTION:** HIGH PRESSURE GAS.
MAY ACCELERATE COMBUSTION.

Keep oil and grease away.
Use equipment rated for cylinder pressure.
Close valve after each use and when empty.
Use in accordance with the Material Safety Data Sheet.

FIRST-AID: **IF INHALED**, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

IN CASE OF FROSTBITE, obtain immediate medial attention.
DO NOT REMOVE THIS PRODUCT LABEL.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL INVENTORY: The components of this product are listed on the DSL Inventory.
OTHER CANADIAN REGULATIONS: Not applicable.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this product are not on the CEPA Priorities Substances Lists.
CANADIAN WHMIS SYMBOLS: **Class A:** Compressed Gases

16. OTHER INFORMATION

PREPARED BY:
CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
858/565-0302

16. OTHER INFORMATION (Continued)

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. AirGas, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, AirGas, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:
ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average **(TWA)**, the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level **(C)**. Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.
PEL - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called Recommended Exposure Levels (**RELs**). When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:
HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]. Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures). **PERSONAL PROTECTIVE EQUIPMENT CODES: B:** Gloves and goggles; **C:** Gloves, goggles, rubber apron (appropriate body protection); **D:** Gloves, goggles, faceshield; rubber apron (appropriate body protection);. **X:** Special attention should be given to PPE Selection.

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:
Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:
Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: LD_{50} - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; LC_{50} - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m^3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

REGULATORY INFORMATION:
This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the Canadian Domestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations.

NON-FLAMMABLE GAS MIXTURE (002103) MSDS
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ALCONOX

MATERIAL SAFETY DATA SHEET

Section 1 – PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: ALCONOX

GENERAL USE: Detergent Cleaner
PRODUCT DESCRIPTION: White granular powder mixture, practically odorless

MANUFACTURERS NAME: Alconox, Inc	DATE PREPARED: October 8, 2003	Page 1 of 4
STREET ADDRESS: 30 Glenn St. Suite 309	TELEPHONE NUMBER FOR INFORMATION ++914-948-4040	
CITY, STATE, ZIP, COUNTRY White Plains, NY 10603 USA	EMERGENCY TELEPHONE NUMBER CHEM-TEL (800) 255-3924 Outside USA ++813-248-0573	
DISTRIBUTOR NAME: same unless filled in		
STREET ADDRESS:	TELEPHONE NUMBER FOR INFORMATION	
CITY, STATE, ZIP, COUNTRY	EMERGENCY TELEPHONE NUMBER	

SECTION 2 – HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	CAS #	% By Wt	OSHA PEL		ACGIH TWA		SARA TITLE III	RQ LBS.
			ppm	mg/m³	ppm	mg/m³		
Sodium phosphate, tribasic (a)	7758-29-40	10-30	N/E					5000
Sodium carbonate (nuisance dust)	497-19-8	7-13		15				
Sodium dodecylbenzene sulfonate (a)	25155-30-0	10-30	N/E					1000
Tetrasodium phosphate	7722-88-5	10-30		5				
(a) see Section 15			N/E not established					

SECTION 3 – HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Granular powder, airborne dust particles are harmful and irritating to respiratory tract. Contact with eyes and skin may cause irritation. Hazard symbols for this product XI,XN.

POTENTIAL HEALTH EFFECTS

INHALATION: Breathing airborne particles or dust from mixing, spraying, sanding, grinding, etc., may cause irritation to the respiratory tract

SKIN: : None expected, however, prolonged contact may cause irritation

EYES: Contact with eyes may cause irritation

INGESTION: May cause gastric distress, stomach pains, vomiting and diarrhea

CARCINOGENICITY NTP? No IARC (MONOGRAPHS)? No OSHA REGULATED? No

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Author	Malcolm McLaughlin	Supercedes: AXeumsds112502

ALCONOX

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: ALCONOX
October 8, 2003

SECTION 4 – FIRST AID MEASURES

INHALATION: Remove affected person to fresh air; if symptoms persist seek medical attention

SKIN: Remove contaminated clothing; wash affected area with soap and water; launder contaminated clothing before reuse; if irritation persists seek medical attention

EYES: Remove contact lenses. Flush eyes with clear running water for 15 minutes while holding eyelids open; if irritation persists, seek medical attention

INGESTION: Give two glasses of water for dilution; DO NOT induce vomiting

SECTION 5 – FIRE FIGHTING MEASURES

FLASH POINT (METHOD USED)	FLAMMABLE LIMITS LEL: NOT APPLICABLE UEL: NOT APPLICABLE	
Non-flammable	AUTOIGNITION TEMPERATURE: Not Determined	NFPA CLASS: none

GENERAL HAZARDS: Product is not considered flammable or combustible. Products of combustion include compounds of carbon, hydrogen and oxygen, including carbon monoxide.

EXTINGUISHING MEDIA: Carbon dioxide, water, water fog, dry chemical, chemical foam

FIRE FIGHTING PROCEDURES: NONE

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

HAZARDOUS COMBUSTION PRODUCTS: Smoke, fumes, oxides of carbon

SECTION 6 – ENVIRONMENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Confine and segregate product for reuse; place material into approved containers for disposal; for spills in excess of allowable limits (RQ) notify the National Response Center @ (800) 424-8802; refer to CERCLA 40 CFT 302 for detailed instructions

SECTION 7 – HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
Keep container closed when not in use; protect containers from abuse; store containers in cool, dry area. Keep this and other chemicals out of reach of children.

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS

The use of local exhaust ventilation and airborne particle collection is recommended. No other special controls are indicated.

PERSONAL PROTECTION

RESPIRATORY PROTECTION (SPECIFY TYPE): NIOSH approved respirator designed to remove airborne particulate present in excess of maximum allowable concentrations due to operations such as mixing, spraying, sanding, buffing, etc. Refer to 29 CFR 1910 134 or European Standard EN 149 for regulations.

PROTECTIVE GLOVES: Neoprene or rubber gloves

EYE PROTECTION: Safety goggles with side shields

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Safety eyebath nearby

WORK/HYGENIC PRACTICES: Practice safe workplace habits. Minimize body contact with this, as well as all chemicals in general

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ALCONOX

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: ALCONOX
October 8, 2003

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

VAPOR PRESSURE (MM Hg) Not Applicable	VAPOR DENSITY (AIR = 1) Not Applicable
SPECIFIC GRAVITY (WATER = 1) 0.85-1.10	EVAPORATION RATE (WATER = 1) Not Applicable
SOLUBILITY IN WATER Complete to > 10% w/w	FREEZING POINT Not Applicable
pH: 9.5 (1% aqueous solution)	PHYSICAL STATE: Granular Powder
BOILING POINT Not Applicable	APPEARANCE AND ODOR White granular powder, practically odorless
VISCOSITY Not Applicable	VOLATILE ORGANIC COMPOUNDS (VOC) None

SECTION 10 – STABILITY AND REACTIVITY

STABILITY UNSTABLE STABLE XXX	CONDITIONS TO AVOID Store in a cool dry area

INCOMPATABILITY (Materials to Avoid)
Strong oxidizers, strong acids

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Decomposition will no occur if handled and stored properly. In case of fire, oxides of carbon, hydrocarbons, fumes, and smoke may be produced.

HAZARDOUS POLYMERIZATION MAY OCCUR WILL NOT OCCUR XXX	CONDITIONS TO AVOID None

SECTION 11 – TOXICOLOGICAL INFORMATION

Hazardous Ingredients	%	CAS #	LD50 of Ingredient (Species and Route)	LC50 of Ingredient (Species and Route)
Sodium phosphate, tribasic (a)	10-30	7758-29-4	3100 mg/kg oral –rat	Not established
Sodium carbonate (Nuisance Dust)	7-13	497-19-8	4020 mg/kg	1200 mg/m3/2H
Sodium dodecylbenzene sulfonate (a)	10-30	25155-30-0	Not Established	Not Established
Tetrasodium phosphate	10-30	7722-88-5	Not Established	Not established
Mixture as a whole	100%	various	>5.0 g/kg oral-rat	

SECTION 12 – ECOLOGICAL INFORMATION

No data are available on the adverse effects of this material on the environment. Neither COD nor BOD data are available. Based on the chemical composition of their product it is assumed that the mixture can be treated in an acclimatized biological waste treatment plant system in limited quantities. However treatment should be evaluated and approved for each specific biological system. None of the ingredients in this mixture are classified as a Marine Pollutant.

SECTION 13 – DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS: Dispose of in accordance with Local, State , and Federal regulations. Do not flush to waterway. Refer to "40 CFR Protection of Environment Parts 260 – 299" for disposal regulations in the US. Consult your Local, State, and Federal Environmental Protection Agency before disposing of any chemicals.

SECTION 14 – TRANSPORT INFORMATION

PROPER SHIPPING NAME: Not Regulated	IATA HAZARD CLASS / Pack Group: None
HAZARD CLASS / Pack Group: None / None	IMDG HAZARD CLASS: None
REFERENCE: Not Applicable	RID/ADR Dangerous Goods Code: None
IDENTIFICATION NUMBER: None	Canadian TDG Class / Division: None
LABEL: None Required	HAZARD SYMBOLS: None

Note: Transportation information provided is for reference only. Client is urged to consult CFR 49 parts 100 – 177, IMDG, IATA, EC, Canadian TDG, and United Nations TDG information manuals for detailed regulations and exceptions covering specific container sizes, packaging and materials and methods of shipping.

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ALCONOX

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: ALCONOX
October 8, 2003

SECTION 15 – REGULATORY INFORMATION

TSCA (Toxic Substances Control Act):
Components of this product are listed on the TSCA inventory

SARA TITLE III (Superfund Amendments and Reauthorization Act)
311/312 Hazard Categories
Acute Health

313 Reportable Ingredients
None

CERCLA (Comprehensive Response Compensation and Liability Act)
(a) The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) has notification requirements for releases or spills to the environment of the Reportable Quantity (RQ for this mixture = 6,000 lbs) or greater amounts, according to 40 CFR 302

CPR (Canadian Controlled Products Regulations)
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled products Regulations

EINECS (European Inventory of Existing Commercial Chemical Substances)
Components of this product are on the European Inventory of Existing Commercial Chemical substances

AICS (Australian Inventory of Chemical Substances)
Components of this product are on the Australian Inventory of Chemical substances

EC Risk Phrases
R20 Harmful by Inhalation
R36 Irritating to eyes
R37 Irritating to respiratory system
R38 Irritating to skin

EC Safety Phrases
S8 Keep container dry
S22 Do not breath dust
S24 Avoid contact with skin
S25 Avoid contact with eyes

SECTION 16 – OTHER INFORMATION

No Specific Notes

HMIS HAZARD RATINGS	HEALTH	1	0= insignificant	3= high
	FLAMMABILITY	0	1= slight	4= extreme
	REACTIVITY	0	2= moderate	
	PERSONAL PROTECTIVE EQUIPMENT	B	Safety Glasses, Gloves	

REVISION SUMMARY — This MSDS has been revised in the following sections:
No revisions available

MSDS prepared by manufacturer

The information contained herein is believed to be accurate but is not warranted to be so. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of this material even if reasonable safety procedures are followed.

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Issued By	Malcolm McLaughlin	Issue Date: 10/08/03
Author	Malcolm McLaughlin	Supercedes: AXeumsds112502

LIQUI-NOX

MATERIAL SAFETY DATA SHEET

Section 1 – PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: LIQUI-NOX
GENERAL USE: Detergent Cleaner
PRODUCT DESCRIPTION: pale yellow liquid, odorless

MANUFACTURERS NAME: Alconox, Inc	DATE PREPARED: October 23, 2003	Page 1 of 4
STREET ADDRESS: 30 Glenn St. Suite 309	TELEPHONE NUMBER FOR INFORMATION ++914-948-4040	
CITY, STATE, ZIP, COUNTRY White Plains, NY 10603 USA	EMERGENCY TELEPHONE NUMBER CHEM-TEL (800) 255-3924 Outside USA ++813-248-0573	
DISTRIBUTOR NAME: same unless filled in		
STREET ADDRESS:	TELEPHONE NUMBER FOR INFORMATION	
CITY, STATE, ZIP, COUNTRY	EMERGENCY TELEPHONE NUMBER	

SECTION 2 – HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	CAS #	% By Wt	OSHA PEL		ACGIH TWA		SARA TITLE III	RQ LBS.
			ppm	mg/m³	ppm	mg/m³		
Sodium dodecylbenzene sulfonate (a)	25155-30-0	10-30	N/E	N/E	N/E	N/E		1000
(a) see Section 15			not est = not established					

SECTION 3 – HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Mild liquid, prolonged contact may cause skin & eye irritation. Ingestion may cause gastric distress

POTENTIAL HEALTH EFFECTS

INHALATION: None expected, however, certain individuals may be sensitized and experience minor nausea or headaches.

SKIN: None expected, however, prolonged contact may cause irritation

EYES: Contact with eyes may cause irritation.

INGESTION: May cause gastric distress, vomiting and diarrhea.

CARCINOGENICITY NTP? No IARC (MONOGRAPHS)? No OSHA REGULATED? No

Document Name	MSDSLQ.doc	Effective date: 10/31/2003
Issued By	Malcolm McLaughlin	Issue Date: 10/23/03
Author	Malcolm McLaughlin	Supercedes: LQeumsds112202

LIQUI-NOX

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: LIQUI-NOX
October 23, 2003

SECTION 4 – FIRST AID MEASURES

INHALATION: Remove affected person to fresh air; if symptoms persist seek medical attention.

SKIN: Remove contaminated clothing; wash affected area with soap and water; launder contaminated clothing before reuse; if irritation persists seek medical attention.

EYES: Remove contact lenses. Flush eyes with water for 15 minutes; if irritation persists, seek medical attention

INGESTION: Give two glasses of water for dilution; DO NOT induce vomiting; see medical attention

SECTION 5 – FIRE FIGHTING MEASURES

FLASH POINT (METHOD USED)	FLAMMABLE LIMITS LEL: NOT APPLICABLE UEL: NOT APPLICABLE	
Non-flammable	AUTOIGNITION TEMPERATURE: Not Determined	NFPA CLASS: none

GENERAL HAZARDS: Product is not considered flammable or combustible. Products of combustion include compounds of carbon, hydrogen and oxygen, including carbon monoxide.

EXTINGUISHING MEDIA: Carbon dioxide, water, water fog, dry chemical, chemical foam,

FIRE FIGHTING PROCEDURES: Keep containers coll with water spray to prevent container rupture due to steam buildup; floor will become slippery if material is released.

UNUSUAL FIRE AND EXPLOSION HAZARDS; None

HAZARDOUS COMBUSTION PRODUCTS: Smoke, fumes, oxides of carbon

SECTION 6 – ENVIRONMENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Small spills – wash to sanitary sewer with plenty of water. Large spills - confine spill, soak up with approved absorbent, shovel product into approved container for disposal. For spills in excess of allowable limits (RQ) notify the National Response Center (800) 424-8802; refer to CERCLA 40 CFR 302 for complete regulations concerning reporting requirements.

SECTION 7 – HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep container closed when not in use; protect containers from abuse; protect from extreme temperatures. Keep this and other chemicals out of reach of children.

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS

The use of local exhaust ventilation is recommended. No other special controls are indicated.

PERSONAL PROTECTION

RESPIRATORY PROTECTION (SPECIFY TYPE): None Required

PROTECTIVE GLOVES: Recommended for general protection.

EYE PROTECTION: Recommended for general protection

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Safety eyebath nearby.

WORK/HYGENIC PRACTICES: Practice safe workplace habits. Minimize body contact with this, as well as all chemicals in general.

LIQUI-NOX

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: LIQUI-NOX
October 23, 2003

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

VAPOR PRESSURE (MM Hg) 17 mm Hg @ 20° C	VAPOR DENSITY (AIR = 1) >1
SPECIFIC GRAVITY (WATER = 1) 1.083	EVAPORATION RATE (WATER = 1) <1
SOLUBILITY IN WATER Complete	FREEZING POINT Not Determined
BOILING POINT 212°F (100°C)	APPEARANCE AND ODOR Pale yellow liquid, odorless
pH: 8.5	PHYSICAL STATE: Liquid
VISCOSITY Not Determined	VOLATILE ORGANIC COMPOUNDS (VOC) None

SECTION 10 – STABILITY AND REACTIVITY

STABILITY UNSTABLE STABLE XXX	CONDITIONS TO AVOID Extreme temperatures

INCOMPATABILITY (Materials to Avoid)
Strong oxidizers, strong acids

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Decomposition will no occur if handled and stored properly. In case of fire, oxides of carbon, hydrocarbons, fumes, and smoke may be produced.

HAZARDOUS POLYMERIZATION MAY OCCUR WILL NOT OCCUR XXX	CONDITIONS TO AVOID None

SECTION 11 – TOXICOLOGICAL INFORMATION

Hazardous Ingredients	%	CAS #	LD50 of Ingredient (Species and Route)	LC50 of Ingredient (Species and Route)
Sodium dodecylbenzene sulfonate (a)	10-30	25155-30-0	Not established	Not established
Mixture of all ingredients	100%	N/A	>5 g/kg oral rat	

SECTION 12 – ECOLOGICAL INFORMATION

No data are available on the adverse effects of this material on the environment. Neither COD nor BOD data are available. Based on the chemical composition of their product it is assumed that the mixture can be treated in an acclimatized biological waste treatment plant system in limited quantities. However should treatment should be evaluated and approved for each specific biological system. None of the ingredients in this mixture are classified as a Marine Pollutant.

SECTION 13 – DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS: Dispose of in accordance with Local, State, and Federal regulations. Products classified as non-hazardous may become hazardous waste upon contact with other products. Refer to "40 CFR Protection of Environment Parts 260-299" for complete waste disposal regulations. Consult your local, state, or Federal Environmental Protection Agency before disposing of any chemicals.

SECTION 14 – TRANSPORT INFORMATION

PROPER SHIPPING NAME: Not Regulated
HAZARD CLASS / Pack Group: None / None
REFERENCE: Not Applicable
IDENTIFICATION NUMBER: None
LABEL: None Required

IATA HAZARD CLASS / Pack Group: None
IMDG HAZARD CLASS: None
RID/ADR Dangerous Goods Code: None
Canadian TDG Class / Division: None
HAZARD SYMBOLS: None

Note: Transportation information provided is for reference only. Client is urged to consult CFR 49 parts 100 – 177, IMDG, IATA, EC, Canadian TDG, and United Nations TDG information manuals for detailed regulations and exceptions covering specific container sizes, packaging and materials and methods of shipping.

Document Name	MSDSLQ.doc	Effective date: 10/31/2003
Issued By	Malcolm McLaughlin	Issue Date: 10/23/03
Author	Malcolm McLaughlin	Supercedes: LQeumsds112202

LIQUI-NOX

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: LIQUI-NOX
October 23, 2003

SECTION 15 – REGULATORY INFORMATION

TSCA (Toxic Substances Control Act):
Components of this product are listed on the TSCA inventory

SARA TITLE III (Superfund Amendments and Reauthorization Act)
311/312 Hazard Categories
None

313 Reportable Ingredients
None

CERCLA (Comprehensive Response Compensation and Liability Act)
(a) The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) has notification requirements for releases or spills to the environment of the Reportable Quantity (RQ for this mixture = 5,000 lbs) or greater amounts, according to 40 CFR 302

CPR (Canadian Controlled Products Regulations)
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled products Regulations

EINECS (European Inventory of Existing Commercial Chemical Substances)
Components of this product are on the European Inventory of Existing Commercial Chemical substances

AICS (Australian Inventory of Chemical Substances)
Components of this product are on the Australian Inventory of Chemical substances

EC Risk Phrases

EC Safety Phrases
S2 Keep out of reach of children

SECTION 16 – OTHER INFORMATION

No Specific Notes

HMIS HAZARD RATINGS	HEALTH	1	0= insignificant	3= high
	FLAMMABILITY	0	1= slight	4= extreme
	REACTIVITY	0	2= moderate	
	PERSONAL PROTECTIVE EQUIPMENT	A	Safety Glasses	

REVISION SUMMARY — This MSDS has been revised in the following sections:
No revisions available

MSDS prepared by manufacturer

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Document Name	MSDSLQ.doc	Effective date: 10/31/2003
Issued By	Malcolm McLaughlin	Issue Date: 10/23/03
Author	Malcolm McLaughlin	Supercedes: LQeumsds112202

Black Hills Lignite, LLC
MATERIAL SAFETY AND TRANSPORTATION DATA SHEET

SECTION 1 **PRODUCT IDENTIFICATION**

MANUFACTURERS NAME
Black Hills Bentonite, a Limited Liability Company
Trade Name: Granular Bentonite

TELEPHONE NO.
(307) 265-3740

ADDRESS
P.O. Box 9, Mills, WY 82644

CHEMICAL NAME AND SYNONYMS
Hydrous Silicate of Alumina / Wyoming Sodium Bentonite/Sodium Montmorillonite CAS No. 1302-78-9

SECTION 2 **HAZARDOUS INGREDIENTS**

CAS #	Component	Percentage	Exposure Limit
14808-60-7	Crystalline Silica in the form of Quartz	>1%	PEL - See Below TLV - 0.05 mg/m^3 TWA (respirable fraction) MSHA - See Below

OSHA PEL and MSHA Exposure Limit for Crystaline Silica Quartz: $\frac{10\text{mg/m}^3}{\%\text{ Silica} + 2}$ (Respirable)

National Institute for Occupational Safety and Health (NIOSH) has recommended that the permissible exposure limit be changes to 50 micrograms respirable free silica per cubic meter of air (0.05 mg/m^3) as determined by a full shift sample up to 10 hour working day, 40 hours per week. The 1974 NIOSH Criteria for recommended Standard for Occupational Exposure to Crystalline Silica should be consulted for more detailed information.

PEL means OSHA Permissible Exposure Limit.
TLV means American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value.
MSHA means Mine Safety and Health Administration Exposure Limit.
TWA means 8 hour time weighted average.

Note: The Permissible Exposure Limits (PEL) reported above are the pre- 1989 limits that were reinstated by OSHA June 30, 1993 following a decision by the 11th Circuit Court of Appeals. Thes PELs are now being enforced by Federal OSHA. Be aware that more restrictive exposure limits may be enforced by some states, agencies or other authorities.

SECTION 3 **PHYSICAL DATA**

http://www.bhbentonite.com/msd-granularbentonite.html 11/1/2004

BOILING POINT (°F) Not Applicable	SPECIFIC GRAVITY (H_2O = 1) 2.6
VAPOR PRESSURE (mm Hg) Not Applicable	VAPOR DENSITY (AIR = 1) Not Applicable
EVAPORATION RATE Not Applicable	SOLUBILITY IN WATER Negligible
APPEARANCE AND ODOR Yellow, Blue, Brown granules or powder. Earthy odor.	DENSITY @ 20° C: UNCOMPACTED: 68 lbs/cubic foot

HAZARDOUS MATERIALS IDENTIFICATION

	DEGREE OF HAZARD
1 Health Hazard	4 = EXTREME
0 Flammability	3 = High
0 Reactivity	2 = Moderate
	1 = Slight
	0 = Insignificant

SECTION 4 **FIRE AND EXPLOSION DATA**

FLASH POINT	FLAMMABLE LIMITS
Not Applicable	Non Flammable

SECTION 5 **HEALTH HAZARD DATA**

CARCINOGENICITY - SEE ROUTES OF EXPOSURE AND EFFECTS (BELOW)

ACUTE ORAL LD_{50}	ACUTE DERMAL LD_{50}	AQUATIC TOXICITY (LC_{50})
ND	ND	10,000 mg/l

Inhalation: Breathing prolonged and excessive amounts of Bentonite dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may have the following serious chronic health effects:

Pneumoconiosis: Excessive inhalation of respirable dust may cause pneumonoconiosis, a respiratory disease, which can result in delayed, progressive, disabling and sometimes fatal lung injury. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with pneumoconiosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1 - carcinogenic to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (published in June 1997) in conjunction with the use of these materials. The National Toxicology Program classifies respirable crystalline silica as "known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

Other Data with Possible Relevance to Human Health:

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant

disease endpoints such as scleroderma (an immune system disorder manifested by fibrosis of the lungs, skin and other internal organs) and kidney disease.

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine Volume 155, pages 761-768, 1997.

SKIN Potential irritant.	EYE Potential irritant.	INHALATION Irritation to lungs, nose, and throat.
EMERGENCY FIRST AID PROCEDURES		
EYES: Flush with water.	SKIN: Wash with soap and water.	
If inhaled and effects occur, move to fresh air. If breathing is irregular, administer oxygen		

SECTION 6 REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY Stable	INCOMPATIBILITY None
HAZARDOUS DECOMPOSITION PRODUCTS None	HAZARDOUS POLYMERIZATION Will not occur.

SECTION 7 SPILL OR LEAK PROCEDURES

STEPS TO TAKE IF MATERIAL IS RELEASED OR SPILLED
If uncontaminated, sweep up or collect, and reuse product. Product becomes slippery when wet.

WASTE DISPOSAL METHOD
Dispose of in accordance with all Federal, State and Local regulations.

NEUTRALIZING CHEMICALS
Not Applicable

SECTION 8 SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION
Use NIOSH approved mechanical filter respirator for nontoxic dusts if dust concentration exceeds $10mg/m^3$

VENTILATION
Sufficient to keep dust levels below the TLV for crystalline silica.

PROTECTIVE GLOVES
General duty work gloves.

EYE PROTECTION
If high dust conditions exist, tight fitting goggles are recommended.

OTHER PROTECTIVE EQUIPMENT
Eyewash

SECTION 9 SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store out of the weather. Product becomes slippery when wet. Avoid contact water in walk areas.

OTHER PRECAUTIONS

http://www.bhbentonite.com/msd-granularbentonite.html 11/1/2004

PROPER SHIPPING NAME
Not Regulated

PLACARDS
None

HAZARD CLASS
Not Nazardous

REPORTABLE QUANTITY
None

HAZARDOUS SUBSTANCE
None

ID NUMBER
None

LABEL
None Required

SECTION 10 **REGULATORY INFORMATION**

SARA reuires the submission of annual reports of toxic chemicals that appear in 40 CFR 372 (for SARA 313). This information must be included in all MSDS that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

Chemical: CAS #:
NONE

Toxic Substances Control Act (TSCA)
The ingrediants of this product are on teh TSCA inventory.

SECTION 11 **STATE RIGHT TO KNOW**

Quartz is a Canadian WHMIS (Workplace Hazardous Material Information System) Ingrediant Disclosure List, Massachusetts Substance List, New Jersey Right to Know Hazardous Substance List, and Pennsylvania Hazardous Substance List.

PREPARED BY: BLACK HILLS BENTONITE, LLC. DATE: FEBRUARY, 2001

MSDS Number: **H3883** * * * * * *Effective Date: 05/07/03* * * * * * *Supercedes: 11/02/01*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

HYDROCHLORIC ACID (LESS THAN 10%)

1. Product Identification

Synonyms: Muriatic acid solution; 10:1 Dilute Hydrochloric acid; Hydrochloric acid volumetric solutions (0.2 - 2.0 N)
CAS No.: 7647-01-0
Molecular Weight: 36.46
Chemical Formula: HCl in water
Product Codes:
J.T. Baker: 0325, 0335, 0336, 4655, 5612, 5616, 5620, 5622
Mallinckrodt: 6388, H162, H163, H959, V028, V043

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Hydrogen Chloride	7647-01-0	0.7 - 8%	Yes
Water	7732-18-5	92 - 99%	No

3. Hazards Identification

Emergency Overview

DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Health hazards given on this data sheet apply to concentrated solutions of hydrochloric acid. Hazards of dilute solutions may be reduced, depending upon the concentration. Degree of hazard for these reduced concentrations is not currently addressed in the available literature.

Inhalation:
Corrosive! Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure, and death.
Ingestion:
Corrosive! Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea, and in severe cases, death.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and discolor skin.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth. Long term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

. First Aid Measures

First aid procedures given apply to concentrated solutions. Exposures to dilute solutions may not require these extensive first aid procedures.
Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

tp://www.jtbaker.com/msds/englishhtml/h3883.htm 9/28/2004

Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. May react with metals or heat to release flammable hydrogen gas.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Water or water spray. Neutralize with soda ash or slaked lime.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving hydrochloric acid. Stay away from ends of tanks. Cool tanks with water spray until well after fire is out.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB® or TEAM® 'Low Na+' acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage.

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Protect from physical damage. Keep out of direct sunlight and away from heat and incompatible materials. Do not wash out container and use it for other purposes. When diluting, always add the acid to water; never add water to the acid. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Protect from freezing. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Hydrochloric acid:
- OSHA Permissible Exposure Limit (PEL):
5 ppm (Ceiling)
- ACGIH Threshold Limit Value (TLV):
2 ppm (Ceiling), A4 Not classifiable as a human carcinogen

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless solution.

Odor:
Pungent, hydrochloric acid.

Solubility:
Infinitely soluble.

Specific Gravity:
ca. 1

pH:

For HCL solutions: 0.1 (1.0 N), 1.1 (0.1 N), 2.02 (0.01 N)
% Volatiles by volume @ 21C (70F):
100 (as water and acid)
Boiling Point:
ca. 100C (ca. 212F)
Melting Point:
ca. 0C (ca. 32F)
Vapor Density (Air=1):
Essentially the same as water.
Vapor Pressure (mm Hg):
Essentially the same as water.
Evaporation Rate (BuAc=1):
Essentially the same as water.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A strong mineral acid, concentrated hydrochloric acid is highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.
Conditions to Avoid:
Heat, direct sunlight, incompatibles.

11. Toxicological Information

Hydrochloric acid: Inhalation rat LC50: 3124 ppm/1H; Oral rabbit LD50: 900 mg/kg. Investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Hydrogen Chloride (7647-01-0)	No	No	3
Water (7732-18-5)	No	No	None

12. Ecological Information

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Environmental Fate:
For Hydrochloric Acid (Concentrated Solutions):
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.
Environmental Toxicity:
For Hydrochloric Acid (Concentrated Solutions):
This material may be toxic to aquatic life. LC50 Shrimp: 100-300 ppm/48-hr/salt water; LC100 trout: 10 mg/l/24-hr; TLm mosquito fish: 282 ppm/96-hr.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: HYDROCHLORIC ACID SOLUTION
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 200L

International (Water, I.M.O.)

Proper Shipping Name: HYDROCHLORIC ACID SOLUTION
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 200L

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Hydrogen Chloride (7647-01-0)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.

Hydrogen Chloride (7647-01-0)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Hydrogen Chloride (7647-01-0)	5000	500*	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Hydrogen Chloride (7647-01-0)	5000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:

http://www.jtbaker.com/msds/englishhtml/h3883.htm 9/28/2004

MSDS Section(s) changed since last revision of document include: 8.

Disclaimer:

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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

LEHIGH

LEHIGH PORTLAND CEMENT COMPANY

MATERIAL SAFETY DATA SHEET

FOR

PORTLAND CEMENT

MSDS NUMBER:

EFFECTIVE DATE: OCTOBER 1997

1. PRODUCT/COMPANY IDENTIFICATION

Manufacturer's Name & Address:

Lehigh Portland Cement Company
7660 Imperial Way
Allentown, PA 18195

Chemical Family:

Calcium Compounds

Chemical Name and Synonyms:

Portland Cement (CAS # 65997-15-1), Hydraulic Cement

Telephone Number for Information:
800-523-5488

Trade Name and Synonyms:

Lehigh Portland Cement Types I, II, III, V
Lehigh White Cement Types I, III, V
Lehigh Colored Portland Cement
Lehigh Portland/Lime Cement Types N, S

2. EMERGENCY AND FIRST AID

EMERGENCY INFORMATION:

Portland cement is a light gray or white powder. When in contact with moisture in eyes or on skin, or when mixed with water, portland cement becomes highly caustic (pH > 12) and will damage or burn (as severely as third-degree)

	the eyes or skin. Inhalation may cause irritation to the moist mucous membranes of the nose, throat and upper respiratory system or may cause or may aggravate certain lung diseases or conditions. Use exposure controls or personal protection methods described in Section 10.
EYES:	Immediately flush eye thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.
SKIN:	Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment if irritation or inflammation develops or persists. Seek immediate medical treatment in the event of burns.
INHALATION:	Remove person to fresh air. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. Seek medical help if coughing and other symptoms do not subside. Inhalation of large amounts of portland cement require immediate medical attention.
INGESTION:	Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

3. COMPOSITION INFORMATION

DESCRIPTION:	This product consists of finely ground portland cement clinker mixed with a small amount of gypsum (calcium sulfate dihydrate). The portland cement clinker is made by heating to a high temperature a mixture of substances such as limestone, sand, clay and shale. Portland cement is essentially hydraulic calcium silicates contained in a crystalline mass, not separable into individual components.

Major compounds are:

$3CaO•SiO_2$	Tricalcium Silicate	CAS #12168-85-3
$2CaO•SiO_2$	Dicalcium Silicate	CAS #10034-77-2
$3CaO•Al_2O_3$	Tricalcium Aluminate	CAS #12042-78-3
$4CaO•Al_2O_3•Fe_2O_3$	Tetracalcium aluminoferrite	CAS #12068-35-8
$CaSO_4•2H_2O$	Calcium Sulfate dihydrate (Gypsum)	CAS #7778-18-9 (CAS #13397-24-5)

4. HAZARDOUS INGREDIENTS

COMPONENT	OSHA PEL (8-Hour TWA)	ACGIH TLV-TWA (1995-1996)	NIOSH REL (8-Hour TWA)
Portland Cement (CAS #65997-15-1) 50 to 95% by weight	5 mg respirable dust/m^3 15 mg total dust/m^3	10 mg total dust/m^3	
Calcium sulfate (CAS #7778-18-9) [Gypsum (CAS #13397-24-5)] 0 to 10% by weight	5 mg respirable dust/m^3 15 mg total dust/m^3	10 mg total dust/m^3	
Iron oxide (CAS #1309-37-1) 0 to 15% by weight	10 mg/m^3	5 mg/m^3	
Calcium carbonate (CAS #1317-65-3) 0 to 5% by weight	5 mg respirable dust/m^3 15 mg total dust/m^3	10 mg total dust/m^3	

Magnesium oxide (CAS #1309-48-4) 0 to 5% by weight	15 mg total dust/m^3	10 mg total dust/m^3	
Calcium oxide (CAS #1306-78-8) 0 to 5% by weight	5 mg/m^3	2 mg/m^3	
Crystalline silica (CAS #14808-60-7) 0 to 0.1% by weight	10 mg of respirable dust/m^3 % SiO_2 + 2	0.10 mg respirable quartz/m^3	0.05 mg respirable quartz dust/m^3
	30 mg of total dust/m^3 % SiO_2 + 2		
	250 million particles/ft^3 % SiO_2 + 5		

TRACE INGREDIENTS:

Due to the use of substances mined from the earth's crust, trace amounts of naturally occurring, potentially harmful constituents may be detected during chemical analysis. Portland cement may contain up to 0.75% insoluble residue. A small amount of this residue includes free crystalline silica. Portland cement also may contain trace (<0.05%) amounts of chromium salts or compounds (including hexavalent chromium) or other metals (including nickel compounds) found to be hazardous or toxic in some chemical forms. These metals are present mostly as trace substitutions within the principal minerals. Other trace constituents may include potassium and sodium sulfate compounds.

5. HAZARD IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

NOTE: Potential health effects may vary depending upon the duration and degree of exposure. To reduce or eliminate health hazards associated with this product, use exposure controls or personal protection methods as described in Section 10.

EYE CONTACT:	(Acute/Chronic) Exposure to airborne dust may cause immediate or delayed irritation or inflammation of the cornea. Eye contact by larger amounts of dry powder or splashes of wet portland cement may cause effects ranging from moderate eye irritation to chemical burns and blindness.
SKIN CONTACT:	(Acute) Exposure to dry portland cement may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Discomfort or pain cannot be relied upon to alert a person to a hazardous skin exposure.
	(Chronic) Dry portland cement coming in contact with wet skin or exposure to wet portland cement may cause more severe skin effects, including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of chemical (caustic) burns.
	(Acute/Chronic) Some individuals may exhibit an allergic response upon exposure to portland cement. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers.
INHALATION:	(Acute) Exposure to portland cement may cause irritation to the moist mucous membranes of the nose, throat and upper respiratory system. Pre-existing upper respiratory and lung diseases may be aggravated by inhalation of portland cement.
	(Chronic) Inhalation exposure to free crystalline silica may cause delayed lung injury including silicosis, a disabling

and potentially fatal lung disease, and/or cause or aggravate other lung diseases or conditions.

INGESTION: (Acute/Chronic) Internal discomfort or ill effects are possible if large quantities are swallowed.

CARCINOGENIC POTENTIAL: Portland cement is not recognized as a carcinogen by NTP, OSHA, or IARC. However, it may contain trace amounts of heavy metals recognized as carcinogens by these organizations. In addition, IARC classifies crystalline silica, a trace constituent, as a known human carcinogen (Group I). NTP has characterized respirable silica as "reasonably anticipated to be a carcinogen." (See also Section 13.)

6. PHYSICAL/CHEMICAL DATA

APPEARANCE/ODOR:	Gray, white or colored powder, odorless	PHYSICAL STATE:	Solid (Powder)
BOILING POINT:	> 1000ƒC	MELTING POINT:	Not applicable
VAPOR PRESSURE:	Not applicable	VAPOR DENSITY:	Not applicable
pH (IN WATER) (ASTM D 1293-95)	12 to 13	SOLUBILITY IN WATER:	Slightly soluble (0.1% to 1.0%)
SPECIFIC GRAVITY (H_2O = 1.0):	3.15	EVAPORATION RATE:	Not applicable

7. FIRE AND EXPLOSION

FLASH POINT:	None	LOWER EXPLOSIVE LIMIT:	None

AUTO IGNITION TEMPERATURE:	Not combustible	UPPER EXPLOSIVE LIMIT:	None
FLAMMABLE LIMITS	Not applicable	SPECIAL FIRE FIGHTING PROCEDURES:	None
EXTINGUISHING MEDIA:	Not combustible	UNUSUAL FIRE AND EXPLOSION HAZARDS:	None
HAZARDOUS COMBUSTION PRODUCTS:	None		

8. STABILITY AND REACTIVITY DATA

STABILITY:	Product is stable. Keep dry until used.
CONDITIONS TO AVOID:	Unintentional contact with water. Contact with water will result in hydration and produces (caustic) calcium hydroxide.
INCOMPATIBILITY:	Wet portland cement is alkaline. As such, it is incompatible with acids, ammonium salts and aluminum metal.
HAZARDOUS DECOMPOSITION:	Will not occur.
HAZARDOUS POLYMERIZATION:	Will not occur.

9. PRECAUTIONS FOR HANDLING, STORAGE AND DISPOSAL

HANDLING AND STORAGE	Keep dry until used. Handle and store in a manner so that airborne dust does not exceed applicable exposure limits. Use adequate ventilation and dust collection. Use exposure control and personal protection methods as described in Section 10.
SPILL:	Use dry clean-up methods that do not disperse dust into the air or entry into surface water. Material can be used if not contaminated. Place in an appropriate container for disposal or use. Avoid inhalation of dust and contact with skin and eyes. Use exposure control and personal protection methods as described in Section 10.
DISPOSAL:	Comply with all applicable local, state and federal regulations for disposal of unusable or contaminated materials. Dispose of packaging/containers according to local, state and federal regulations.

10. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION:	Use local exhaust or general dilution ventilation to control dust levels below applicable exposure limits. Minimize dispersal of dust into the air. If local or general ventilation is not adequate to control dust levels below applicable exposure limits or when dust causes irritation or discomfort, use MSHA/NIOSH approved respirators.
EYE PROTECTION:	Wear safety glasses with side shields or goggles to avoid contact with the eyes. In extremely dusty environments and unpredictable environments, wear tight-fitting unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when handling cement or cement containing products.

SKIN PROTECTION:	Wear impervious abrasion- and alkali-resistant gloves, boots, long-sleeved shirt, long pants or other protective clothing to prevent skin contact. Promptly remove clothing dusty with dry portland cement or clothing dampened with moisture mixed with portland cement, and launder before re-use. If contact occurs, wash areas contacted by material with pH neutral soap and water.

11. TRANSPORTATION DATA

Portland cement is not hazardous under U.S. DOT or TDG regulations.

12. TOXICOLOGICAL AND ECOLOGICAL INFORMATION

For a description of available, more detailed toxicological and ecological information, contact Lehigh Portland Cement Company.

13. OTHER REGULATORY INFORMATION

Status under US OSHA Hazard Communication Rule 29 CFR 1910.1200:	Portland cement is considered a hazardous chemical under this regulation and should be included in the employer's hazard communication program.
Status under CERCLA/Superfund, 40 CFR 117 and 302:	Not listed.
Hazard Category under SARA (Title III), Sections 311 and 312:	Portland cement qualifies as a hazardous substance with delayed health effects.
Status under SARA (Title III), Section 313:	Not subject to reporting requirements under Section 313.
Status under TSCA (as of May 1997):	Some substances in portland cement are on the TSCA

	inventory list.
Status under the Federal Hazardous Substances Act:	Portland cement is a hazardous substance subject to statutes promulgated under the subject act.
Status under California Proposition 65:	This product contains crystalline silica, a substance known to the State of California to cause cancer. This product also may contain trace amounts of heavy metals known to the State of California to cause cancer, birth defects or other reproductive harm.
Status under Canadian Environmental Protection Act:	Not listed.
Status under Canadian WHMIS:	Portland cement is considered to be a hazardous material under the Hazardous Products Act as defined by the Controlled Products Regulations (Class D2A, E - Corrosive Material) and subject to the requirements of WHMIS.

14. OTHER INFORMATION

This MSDS provides information on various types of portland cement products. A particular product's composition may vary from sample to sample. The information provided herein is believed by Lehigh Portland Cement Company to be accurate at the time of preparation or prepared from sources believed to be reliable. Health and safety precautions in this data sheet may not be adequate for all individuals or situations. Users have the responsibility to comply with all laws and procedures applicable to the safe handling and use of the product, to determine the suitability of the product for its intended use, and to understand possible hazards associated with mixing portland cement with other materials. SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY LEHIGH PORTLAND CEMENT COMPANY.

ABBREVIATIONS

ACGIH American Conference of Governmental Industrial Hygienists

ASTM American Society for Testing and Materials

CAS Chemical Abstract Service

CERCLA Comprehensive Environmental Response, Compensation and Liability Act

CFR Code of Federal Regulations

ft^3 Cubic foot

IARC International Agency for Research on Cancer

m^3 Cubic meter

mg Milligram

MSHA Mine Safety and Health Administration

NIOSH National Institute for Occupational Safety and Health

NTP National Toxicology Program

OSHA Occupational Safety and Health Administration

PEL Permissible Exposure Limit

REL Recommended Exposure Limit

SARA Superfund Amendments and Reauthorization Act

TDG Transportation of Dangerous Goods

TLV Threshold Limit Value

TSCA Toxic Substance Control Act

TWA Time Weighted Average

WHMIS Workplace Hazardous Materials Information System

GARY-WILLIAMS
ENERGY CORPORATION

Gary-Williams Energy Corp.
370 17th Street
Suite 5300
Denver, CO 80202

MATERIAL SAFETY DATA SHEET	October 20, 1999	MSDS NUMBER W-3035
EMERGENCY TELEPHONE NUMBERS	COMPANY 405-665-6565	CHEMTREC 800/424-9300

I. PRODUCT IDENTIFICATION

PRODUCT	CHEMICAL NAME AND SYNONYMS
DIESEL FUEL (CLEAR)	Petroleum Hydrocarbon Mixture, Distillate, 2- Oil # 2 Diesel Fuel, Fuel Oil #2,
CHEMICAL FAMILY: Petroleum Hydrocarbon Distillate	FORMULA: C11 - C20

National Fire Protection Association Hazard Rating Codes	HEALTH CODE	FIRE CODE	REACTIVITY CODE
Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4	0	2	0

II. SUMMARY OF HAZARDS

CAUTION! COMBUSTIBLE LIQUID AND VAPOR. HARMFUL IF INHALED AND MAY CAUSE DELAYED LUNG INJURY. CAN CAUSE NERVOUS SYSTEM DEPRESSION. ASPIRATION HAZARD IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE. Keep away from heat and flame. Avoid breathing vapor. Use ventilation adequate to keep vapor below recommended exposure limits. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

NIOSH, EPA, & current literature have indicated that breathing whole diesel exhaust over a working lifetime may cause cancer in humans. Animals exposed to whole diesel exhaust over a lifetime have developed lung tumors (cancer). Diesel exhaust may cause eye irritation, headache, light-headedness, nausea, vomiting, heartburn, weakness, numbness, tingling in the extremities, chest tightness and wheezing. Cough and labored breathing have been reported in garage workers without adequate ventilation (air circulation) in the garage.

DOT Hazardous Material	DOT SHIPPING NAME AND NUMBER	DOT HAZARD CLASS
YES	Diesel Fuel, 3, NA1993, III	3 (Flammable Liquid)

III. HAZARDOUS COMPONENTS

INGREDIENT	% RANGE	PEL/TLV	HAZARD
Straight Run Middle Distillate (CAS # 64741-44-2)	60 to 100 %	Petroleum Distillate TWA - 400 ppm	Combustible Acute Health Chronic Health
Light Catalytic Cracked Distillate (CAS # 64741-59-9)	0 to 40 %	Petroleum Distillate TWA - 400 ppm	

Diesel exhaust contains: Nitrogen Dioxide, Sulfuric Acid, Sulfur Dioxide, Aliphatic Aldehydes, Soot containing Polynuclear Aromatic Hydrocarbons, Carbon Monoxide, Hydrogen Sulfide.

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IV. HEALTH INFORMATION

EXPOSURE BY ROUTE OF ENTRY	EXPOSURE CHARACTERISTICS AND FIRST AID	
INHALATION	EFFECTS	Acute: Headache, nasal and respiratory irritation, nausea, drowsiness, breathlessness, fatigue, central nervous system depression, convulsions, and loss of consciousness.
	FIRST AID	Move exposed person to fresh air. If breathing has stopped, perform artificial respiration. Get medical attention as soon as possible.
SKIN	EFFECTS	Acute: irritation Chronic: dermatitis
	FIRST AID	If clothing soaked, immediately remove clothing and wash skin with soap and water. Launder clothing before wearing. Get medical attention promptly.
EYES	EFFECTS	Acute: irritation
	FIRST AID	Immediately flush eyes with water for a minimum of 15 minutes, occasionally lifting the lower and upper lids. Get medical attention promptly.
SWALLOWING INGESTION	EFFECTS	Acute: aspiration hazard, headache, nausea, drowsiness, fatigue, pneumonitis, pulmonary edema, central nervous system depression, convulsions and loss of consciousness.
	FIRST AID	Call a physician immediately, ONLY induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person
Medical conditions Generally Agravated by Exposure	N/AV	

LISTED AS POTENTIAL CARCINOGEN OR CARCINOGEN	NOT LISTED __X__	NATIONAL TOXICOLOGY PROGRAM____
	INTERNATIONAL Agency for Research on Cancer _____	OSHA _____

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V. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION (NIOSH APPROVED RESPIRATORS SEE OSHA STD. 1910.134)

Up to 4000 ppm, half-mask organic vapor respirator. Up to 20,000 ppm, full-face organic vapor respirator or full-face supplied air respirator. Greater than 20,000 ppm, fire fighting, or unknown concentration, self-contained breathing apparatus with positive pressure.

EYE	Safety glasses, chemical goggles or face shield as appropriate.
SKIN	Gloves: Nitrile, neoprene or other material resistant to distillate.

VENTILATION

Maintain local or dilution ventilation to keep air concentration below 400 ppm. Loading, unloading, tank gauging, etc., remain upwind. Request assistance of safety and industrial hygiene personnel to determine air concentrations.

VI. FIRE PROTECTION INFORMATION

FLASH POINT AND METHOD	AUTOIGNITION TEMPERATURE	FLAMMABLE LIMITS % VOLUME IN AIR	LOWER	UPPER
Tag Closed Cup 130 'F	ESTIMATED 490 'F	ESTIMATED	0.7	6

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical, or foam. Water stream may spread fire, use water spray only to cool containers exposed to fire. If leak or spill has not ignited, use water spray to disperse the vapors.

HAZARDOUS DECOMPOSITION PRODUCTS

Incomplete combustion can yield carbon monoxide and various hydrocarbons.

FIRE AND EXPLOSION HAZARDS

Can form combustible mixtures with air when heated.

STORAGE

Do not store with strong oxidizers. Store as OSHA Class II combustible liquid.

HAZARDOUS POLYMERIZATION	STABILITY
WILL NOT OCCUR __X__ MAY OCCUR _____	STABLE __X__ UNSTABLE _____

VII. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT	Reid VAPOR PRESSURE (RVP) at 100 'F	EVAPORATION (ETHYL ETHER = 1)
330 - 675 'F	ESTIMATED less than 0.1 pound	ESTIMATED slower
PERCENT VOLATILE BY VOLUME (%) 100	AVG. MOLECULAR WEIGHT N/A	APPEARANCE May be clear to yellow-brown
ODOR Diesel Fuel	DROP POINT Pour Point -25 to +10 'F	ESTIMATED VAPOR DENSITY (AIR = 1) 6
SPECIFIC GRAVITY 0.8 to 0.9	VISCOSITY 2 to 4 cs at 100'F	SOLUBILITY (G/100g WATER AT 20° C) Negligible

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VIII. ENVIRONMENTAL PROTECTION

SPILLS	Notify emergency response personnel. Evacuate area and remove ignition sources. Build dike to contain flow. Remove free liquid, do not flush to sewer or open water. Pick up with inert absorbent and place in closed container for disposal.
WASTE DISPOSAL	Utilize licensed waste disposal company. Consider recycling or incineration. Utilize permitted hazardous waste disposal site or industrial waste disposal site as appropriate.

ADDITIONAL INFORMATION

The following chemicals are subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and reauthorization Act of 1986 and 40 CFR Part 372:

PREPARED BY	DATE PREPARED
Johnnie L. Ray	October 20, 1999

DISCLAIMER

The information and recommendations contained in this publication have been compiled from sources beleived to be reliable and to represent the best current opinion on the subject at the time of publication. Since we cannot anticipate or control the many different conditions under which this information or our products may be used, we make no gurantee that the recommendations will be adequate for all individuals or situations. Each user of the product described herein should determine the suitability of the described product for his particular purpose and should comply with all federal and state rules and regulations concerning the described product.

ABBREVIATIONS

CAS #	Chemical Abstracts Service Number
N/A	Not Applicable
N/AV	Not Available
ppm	Parts per million
PEL	Permissible Exposure Limit
TLV	Threshold Limit Value Both the OSHA PEL and the American Conference of Governmental Industrial Hygienists TLV were reviewed. Where a difference existed, the more restrictive of the two was selected.
STEL	Short Term Exposure Limit
TWA	Time-Weighted Average

Attachment E
Safe Driving

Emergency Procedures:

Always move out of traffic if possible; stopping on an active highway, even if those in front of you have stopped, may precipitate being hit from the rear. If you must stop on an active roadway, leave at least one car length in front of you, and watch the rear mirror, so you can ease up if someone behind can't stop. Keep your flashers on in this situation. If you are the only driver coming to a stop on an active roadway, leave the flashers on and when safe to do so, exit the car and get to a safe location.

If you must stop due to vehicle failure, etc. try to coast out of traffic. Put on your flashers, and tie a white handkerchief, etc. on the driver's side door or mirror. If you remain in the vehicle, lock the doors. Use your cell phone to summon help.

In the event of a fire in your vehicle, do not endanger yourself by trying to fight it, even if you have an extinguisher, unless you are trained and can safely do so. Do NOT fight a gasoline fire which may spread or explode.

If stranded in snow or a remote location, stay with the vehicle, where you are more likely to be found. Conserve food, water, and heat as possible, and call for help.

Emergency Supplies (As Appropriate and Seasonal)

- Jumper cables to restart engine
- Cat litter or sand for tire traction on snow and ice
- Shovel to scrape snow away from tires
- Ice scraper to clear windshield (and extra washer fluid in bad weather)
- Warm clothes, gloves, a hat, sturdy boots, warm jacket, change of clothes
- Blankets to keep warm inside the vehicle
- Flashlights and extra batteries
- First aid kit; medications incase you are stuck on the road
- Food: items containing protein, such as nuts and energy bars
- Water: bring enough for each person in your car:
- AM/FM radio to listen to traffic reports and emergency messages
- Bring a cell phone and a list of emergency numbers; do NOT use while driving.

Vehicle Inspection (minimal)

Inspect ALL vehicles (personal, private, and rental) prior to driving them.
Minimally, check that tires appear fully aired, and required external equipment is in place

- Check for a spare and jack
- Check the lights and mirrors
- If going into remote areas or in bad weather, check washer (and other) fluid.
- Make sure ice scrapers, etc. are on hand, as appropriate for the season.
- Adjust mirrors to make sure they are functional and cover the “dead space”
- Don the seatbelt
- Turn on the ignition and see if all gauges read correctly.
- Adjust all equipment for your driving BEFORE you start.
- Use the ENSR Vehicle Inspection form for detailed inspection.

Vehicle Operation

- For ENSR, private, and rental vehicles, adjust all controls (mirrors, lights, radio, etc.) PRIOR to leaving the parking space.
- Adjust your outside mirrors to cover the “dead space” ---not the same area covered by the inside mirror---so as to avoid the danger of collision during lane changes.
- NO cell phone use by driver, including hands-free.
- Everyone in the vehicle must wear safety belts while moving
- Abide by speed limits and generally move with traffic---not too slow or fast.
- Driving with headlights on is mandatory in rain, dark, fog (no brights).
- Except for parking, avoid backing situations. If backing with an obstructed view, the passenger will serve as spotter.
- Backing INTO a parking space, though challenging, is encouraged as it avoids backing OUT of one, and into traffic.
- Listen to the radio, or have passenger call 511 for traffic and road condition updates.
- Do not drive when fatigued or tired. Be aware of increased hazards of driving in the dark, or into the sun.
- Use appropriate eyewear: sunglasses, RX
- No headphones

Equipment

- Tie down all tarps, canopies, secure all equipment and supplies
- Pack equipment to minimize obstruction of the driver’s view

- Secure materials INSIDE the passenger compartment too!

Personal Safety

- Plan your route prior to leaving to avoid dubious areas (do a JMP)
- Keep your vehicle locked
- Do not stop for strangers or hitchhikers
- Notify someone of your route before departure, expected arrival time, cell phone number (and notify them upon arrival).
- Do not respond to or participate in road rage. Call 911 if necessary.
- Have the keys in your hand when exiting the vehicle to avoid being locked out; never put them down in the trunk. (be aware that some vehicles lock automatically.

Winter Driving

Know current road conditions, as part of your JMP:

- call 511 - for traveler information
- view weather and traffic - information at www.wsdot.wa.gov
- check local news for weather and traffic reports
- watch electronic highway signs for information
- Clear snow and ice from all windows, mirrors, and lights - even the hood and roof - before driving.
- **Slow Down!** Drive according to road and weather conditions. Remember, the posted speed limits are for dry pavement.
- Leave plenty of room for stopping, and brake early. It takes more time to stop when roads are wet or icy.
- Leave room for maintenance vehicles and plows - stay at least 15 car lengths (200 feet) back and don't pass them on the right.
- Watch for icy surfaces on bridges, even when the rest of the road seems to be in good condition. Bridge decks will ice up first.
- If you start to skid, do NOT brake or accelerate: steer in the direction you want to go.
- Look farther ahead in traffic. Actions by other drivers will alert you to problems and give you extra seconds to react.
- Trucks take longer to stop, so don't cut in front of them.

- Don't use your cruise control or overdrive when it's freezing (or colder). Even roads that appear clear can have isolated slippery spots and the short touch of your brakes to deactivate cruise control can cause you to lose control of your vehicle. With overdrive, as you encounter a hill your vehicle automatically accelerates or downshifts, which can cause loss of traction.
- Don't be overconfident with four-wheel drive. Four-wheel drive helps you get going quicker but it won't help you stop any faster.
- Don't pump anti-lock brakes. The right way is to "stomp and steer."
- Know your vehicle. Look at the Owners Manual if uncertain about some features.
- Adjust to Road Conditions. The faster your vehicle is going, the more distance it will take to turn, slow, or stop.
- Slow down at the first sign of rain, snow, or sleet. When the road is slippery, the vehicle's tires do not grip as well as they do on a dry road.
- Allow extra time. Give yourself extra time to reach your destination when roads may be slick. Consider delaying your trip.
- Drive with your headlights on.
- If at all possible, do not drive when the roads are icy.

Attachment F
Liquinox Letter

ENSR INTERNATIONAL

ENSR International

August 18, 2004

To Whom It May Concern:

Regarding the use of "Alconox" for decontamination on this site, and the inclusion of its MSDS in the Health and Safety Plan (HASP), Appendix D, it is possible that another substance (eg "Liquinox") may be used for this purpose. Despite the specific mention in the HASP of "Alconox" or any other specific substance, under the topic of "Substances Brought On Site," various products may be used on-site, all of which are required to have their MSDS's on the site (or quickly available).

Therefore, in the case of "Alconox," the product "Liquinox" may be used as long as its MSDS is in Appendix D. Likewise, other substances may be used if their MSDS's are also included.

Joseph E Sanders

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Regional H&S Manager

Celebrating 30 Years of Excellence in Environmental Services

Attachment C
Field Methods and Procedures

FIELD METHODS AND PROCEDURES

The following section describes field procedures that will be completed by ENSR personnel in the performance of the tasks involved with this project.

1.0 HEALTH AND SAFETY PLAN

Fieldwork performed by ENSR and subcontractors at the site will be conducted according to guidelines established in a Health and Safety Plan (HASP). The HASP is a document describing the hazards that may be encountered in the field and specifies protective equipment, work procedures, and emergency information. A copy of the HASP will be at the site and available for reference by appropriate parties during work at the site.

2.0 DRILLING AND SOIL SAMPLING

Soil borings and soil samples will be performed under the direction of a qualified ENSR geologist. Soil borings will be drilled using a truck-mounted GeoProbe® rig.

A GeoProbe® (direct-push) rig uses static force and roto-percussion to advance the drill string. The sampler is either 24 or 48 inches in length and has either a 1.0625 inch ID (discrete sampler) or a 1.5 inch ID (macrocore). The sampler is lined with brass sleeves (Shelby tubes) or acetate liners equal to the ID of the sampler. The closed piston sampler is driven to just above the desired depth, the piston sampler is opened, and the sampler is then driven 24 to 48 inches. This process is repeated at each sampling interval; normally at 5-foot intervals, or as directed by the geologist.

All soil samples are examined in the field by a geologist and are described by color, grain size, and moisture content and are classified in accordance with the Unified Soil Classification System visual and manual method (ASTM D2488). A portion of the soil sample is placed into a plastic bag and sealed for headspace analysis of the organic vapors using a photo-ionization detector (PID) equipped with a 10.2ev lamp. The soil sample collected will be labeled, sealed, and stored on ice pending sample selection and transport to the laboratory for analysis.

Representative portions of the samples will be retained for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata and pertinent information regarding the method of maintaining and advancing the boring will be made.

All drilling and sampling equipment will be cleaned before drilling each boring using a high-pressure, steam-cleaning apparatus. Soil cuttings generated during drilling operations will be placed on and covered with visqueen or in 55-gallon United Nations approved drums on site and stored until laboratory results are obtained and proper methods of disposal have been approved.

3.0 SOIL SAMPLE SCREENING

After the vapors in the soil samples are allowed to equilibrate with the air in the headspace of the plastic bags, the organic vapors within the headspace will be screened with a PID or flame ionization detector. The sample bag will be opened and the detector probe immediately placed within the headspace of the bag. The highest observed reading will be recorded. This number provides a relative comparison of the petroleum hydrocarbon concentration with the soil samples but is not quantitative. The field readings will be recorded on the boring logs.

The soil samples will be selected for laboratory analysis on the basis of organic vapor screening results and field observations. Selected soil samples will be submitted to a state certified laboratory for analysis of TPHg and TPHd by EPA Method 8015M, volatile organic compounds VOCs by EPA Method 8260B, motor oil, oil and grease by EPA Method 413.1, and pesticides by EPA Method 8141.

4.0 GRAB GROUNDWATER SAMPLING

Grab groundwater samples will be collected from the boring by lowering a disposable bailer below the static water level or to a depth where hydrostatic pressure is sufficient for sampling. The water collected will be transferred into appropriate containers in a manner that minimizes aeration.

5.0 ANALYTICAL PROCEDURES

Samples collected from the site will be submitted to state certified laboratory for analysis. Samples will be analyzed for TPHg and TPHd by EPA Method 8015M, VOCs by EPA Method 8260B, motor oil, oil and grease by EPA Method 413.1, and pesticides by EPA Method 8141.

6.0 QUALITY ASSURANCE

This section describes the field and analytical procedures to be followed by ENSR throughout the investigation.

6.1 Sample Collection and Handling Procedures

Proper collection and handling are essential to ensure the quality of a sample. Each sample will be collected in the appropriate container, preserved correctly for the intended analysis, and stored prior to analysis for no longer than the maximum allowable holding time. Details on the procedures for collection and handling of soil samples from this project can be found in previous sections.

6.2 Sample Identification and Chain-of-Custody Procedures

Sample identification and chain-of-custody procedures ensure sample integrity and document sample possession from the time of collection to its ultimate disposal. Each sample container submitted for analysis will have a label affixed to identify the job number, sampler, date and time of sample collection, and a sample number unique to that sample. During soil sampling, this information, in addition to a description of the sample, field measurements made, sampling methodology, names of on-site personnel, and any other pertinent field observations, will be recorded on the boring log or in the field records.